C21.5: 953/2

Vol. 953 Number 2

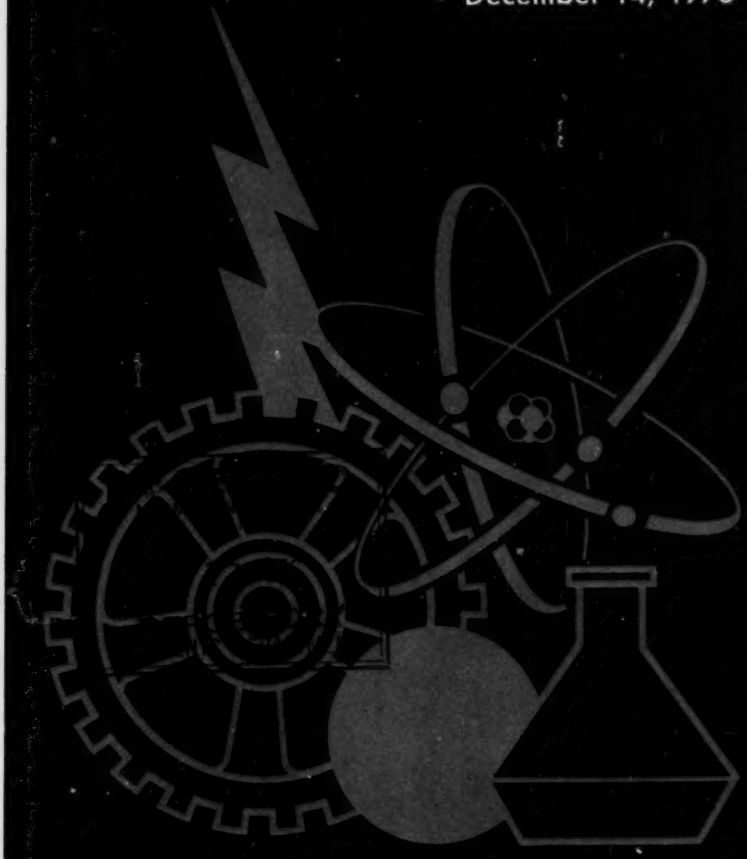
OFFICIAL GAZETTE

of the

UNITED STATES PATENT AND TRADEMARK OFFICE

PATENTS

December 14, 1976



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UNITED STATES PATENT and TRADEMARK OFFICE

December 14, 1976 Volume 953 Number 2

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PATENT NOTICES

Certificates of Correction for the Week of Dec. 14, 1976

Re. 28,997	3,958,908	3,977,035	3,983,684
D. 240,482	3,959,198	3,977,037	3,983,751
3,804,861	3,959,266	3,977,151	3,983,809
3,827,545	3,959,481	3,977,328	3,983,864
3,838,106	3,961,060	3,977,391	3,984,054
3,848,392	3,961,095	3,977,448	3,984,064
3,852,596	3,962,044	3,977,612	3,984,213
3,879,648	3,962,053	3,977,648	3,984,304
3,899,428	3,962,282	3,977,829	3,984,311
3,904,143	3,963,128	3,977,849	3,984,339
3,905,080	3,963,191	3,977,923	3,984,379
3,913,382	3,963,642	3,978,007	3,984,381
3,915,100	3,963,788	3,978,159	3,984,393
3,918,394	3,964,075	3,978,190	3,984,520
3,919,518	3,965,478	3,978,197	3,984,547
3,920,401	3,965,980	3,978,214	3,984,550
3,922,254	3,966,119	3,978,492	3,984,679
3,922,614	3,966,642	3,978,759	3,984,682
3,923,624	3,966,766	3,978,863	3,984,694
3,927,327	3,967,261	3,979,032	3,984,698
3,928,416	3,968,171	3,979,066	3,984,768
3,931,023	3,968,631	3,979,266	3,984,841
3,931,366	3,969,184	3,979,400	3,984,899
3,934,519	3,969,426	3,979,415	3,984,908
3,936,716	3,969,576	3,979,829	3,985,005
3,938,734	3,970,062	3,980,956	3,985,022
3,939,155	3,971,149	3,980,974	3,985,029
3,941,609	3,971,922	3,981,186	3,985,235
3,942,512	3,971,937	3,981,305	3,985,306
3,944,273	3,972,175	3,981,381	3,985,458
3,944,593	3,972,326	3,981,541	3,985,544
3,944,969	3,972,461	3,981,814	3,985,562
3,945,610	3,972,737	3,982,156	3,985,588
3,946,576	3,973,243	3,982,421	3,985,636
3,946,738	3,973,317	3,982,540	3,985,696
3,946,884	3,973,541	3,982,576	3,985,798
3,947,006	3,974,522	3,982,698	3,985,859
3,948,807	3,974,738	3,982,788	3,986,004
3,948,985	3,974,940	3,982,809	3,986,090
3,951,513	3,975,032	3,982,816	3,986,536
3,952,134	3,975,054	3,982,831	3,986,678
3,952,829	3,975,201	3,982,879	3,986,679
3,953,576	3,975,544	3,982,960	3,986,801
3,953,959	3,975,545	3,983,016	3,986,913
3,954,807	3,975,690	3,983,236	3,986,944
3,956,055	3,976,657	3,983,354	3,987,190
3,957,781	3,976,866	3,983,502	
3,958,354	3,977,015	3,983,534	

Disclaimers

3,544,257.—*Bidwell C. Cranage,* Ferguson, Mo. COUPLER ASSEMBLY. Patent dated Dec. 1, 1970. Disclaimer filed Nov. 1, 1976, by the assignee, *Chemetron Corporation.*

Hereby enters this disclaimer to claims 1, 2, 3 and 4 of said patent.

3,671,938.—*Dinh-Tuan Ngo,* Colts Neck, N.J. GASEOUS DISPLAY DEVICE. Patent dated June 20, 1972. Disclaimer filed Oct. 29, 1976, by the assignee, *Bell Telephone Laboratories, Incorporated.*

Hereby enters this disclaimer to claims 1–10 of said patent.

3,843,072.—*Wilson Parker Rayfield,* Levittown, Pa. METHOD OF AND APPARATUS FOR COILING WIRE. Patent dated Oct. 22, 1974. Disclaimer filed Oct. 12, 1976, by the assignee, *Western Electric Company, Incorporated.*

Hereby enters this disclaimer to claims 1, 5, 9, 13, 17 and 18 of said patent.

3,907,977.—*Robert A. Wiesboeck,* Stone Mountain, Ga. METHOD FOR THE PREPARATION OF HIGH PURITY, HIGHLY SURFACE ACTIVE LIASF$_6$. Patent dated Sept. 23, 1975. Disclaimer filed Oct. 6, 1976, by the assignee, *United States Steel Corporation.*

Hereby enters this disclaimer to all claims of said patent.

3,925,224.—*Anthony E. B. Winston,* Liverpool, N.Y. DETERGENT ADDITIVE COMPOSITION. Patent dated Dec. 9, 1975. Disclaimer filed Oct. 14, 1976, by the assignee, *Church & Dwight Co., Inc.*

Hereby enters this disclaimer to claims 1 to 7 of said patent.

PATENT EXAMINING CORPS

RENE D. TEGTMEYER, Assistant Commissioner

WILLIAM FELDMAN, Deputy Assistant Commissioner

CONDITION OF PATENT APPLICATIONS AS OF NOVEMBER 20, 1976

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action
CHEMICAL EXAMINING GROUPS	
GENERAL CHEMISTRY AND PETROLEUM CHEMISTRY, GROUP 110—S. N. ZAHARNA, Director. Inorganic Compounds; Inorganic Compositions; Organo-Metal and Organo-Metalloid Chemistry; Metallurgy; Metal Stock; Electro Chemistry; Batteries; Hydrocarbons; Mineral Oil Technology; Lubricating Compositions; Gaseous Compositions; Fuel and Igniting Devices.	2-2-76
GENERAL ORGANIC CHEMISTRY, GROUP 120—A. L. LEAVITT, Director. Heterocyclic, Amides; Alkaloids; Azo; Sulfur; Misc. Esters; Carbohydrates; Herbicides; Poisons; Medicines; Cosmetics; Steroids; Oxo and Oxy; Quinones; Acids: Carboxylic Acid Esters; Acid Anhydrides; Acid Halides.	3-29-76
HIGH POLYMER CHEMISTRY, PLASTICS AND MOLDING, GROUP 140—A. P. KENT, Director. Synthetic Resins; Rubber; Proteins; Macromolecular Carbohydrates; Mixed Synthetic Resin Compositions; Synthetic Resins With Natural Polymers and Resins; Natural Resins; Reclaiming; Pore-Forming; Compositions (Part) e.g.: Coating; Molding; Ink; Adhesive and Abrading Compositions; Molding, Shaping, and Treating Processes.	10-20-75
COATING AND LAMINATING, BLEACHING, DYEING AND PHOTOGRAPHY, GROUP 160—R. FRIEDMAN, Director. Coating; Processes and Misc. Products; Laminating Methods and Apparatus; Stock Materials; Adhesive Bonding; Special Chemical Manufactures; Special Utility Compositions; Bleaching; Dyeing and Photography.	2-2-76
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 170—H. S. VINCENT, Director. Fertilizers; Foods; Fermentation; Analytical Chemistry; Reactors; Sugar and Starch; Paper Making; Glass Manufacture; Gas; Heating and Illuminating; Cleaning Processes; Liquid Purification; Distillation; Preserving; Liquid, Gas, and Solid Separation; Gas and Liquid Contact Apparatus; Refrigeration; Concentrative Evaporators; Mineral Oils Apparatus; Misc. Physical Processes.	1-8-76
ELECTRICAL EXAMINING GROUPS	
INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—W. L. CARLSON, Director. Generation and Utilization; General Applications; Conversion and Distribution; Heating and Related Art Conductors; Switches; Photography; Motion Pictures; Illumination; Horology; Acoustics; Recorders; Weighing Scales.	8-12-75
SPECIAL LAWS ADMINISTRATION, GROUP 220—C. D. QUARFORTH, Director. Ordnance, Firearms and Ammunition; Radar, Underwater Signalling, Directional Radio, Torpedoes, Seismic Exploring, Radio-Active Batteries; Nuclear Reactors, Powder Metallurgy, Rocket Fuels; Radio-Active Material.	2-2-76
INFORMATION TRANSMISSION, STORAGE AND RETRIEVAL, GROUP 230—J. F. COUCH, Director. Communications; Multiplexing Techniques; Facsimile; Data Processing, Computation and Conversion; Storage Devices and Related Arts.	12-4-75
RECEPTACLES, SANITATION AND CLEANING, WINDING, AND MEASURING, GROUP 240—N. ANSHER, Director. Receptacles; Joint Packing; Conduits; Plumbing Fixtures; Textile Spinning; Food: Agitating; Cleaning; Pressing; Geometrical Instruments; Sound Recording; Winding and Reeling; Measuring and Testing; Indicating.	5-21-76
ELECTRONIC COMPONENT SYSTEMS AND DEVICES, GROUP 250—L. FORMAN, Director. Semi-Conductor and Space Discharge Systems and Devices; Electronic Component Circuits; Wave Transmission Lines and Networks; Optics; Radiant Energy; Measuring.	1-13-76
DESIGNS, GROUP 290—C. D. QUARFORTH, Director. Industrial Arts; Household, Personal and Fine Arts.	6-10-75
MECHANICAL EXAMINING GROUPS	
HANDLING AND TRANSPORTING MEDIA, GROUP 310—D. J. STOCKING, Director. Conveyors; Hoists; Elevators; Article Handling Implements; Store Service; Sheet and Web Feeding; Dispensing; Fluid Sprinkling; Fire Extinguishers; Coin Handling; Check Controlled Apparatus; Classifying and Assorting Solids; Boats; Ships; Aeronautics; Motor and Land Vehicles and Appurtenances; Brakes; Railways and Railway Equipment.	1-23-76
MATERIAL SHAPING, ARTICLE MANUFACTURING, TOOLS, GROUP 320—S. S. MATTHEWS, Director. Manufacturing Processes, Assembling, Combined Machines, Special Article Making; Metal Deforming; Sheet Metal and Wire Working; Metal Fusion—Bonding, Metal Founding; Metallurgical Apparatus: Plastics Working Apparatus; Plastic Block and Earthenware Apparatus: Machine Tools for Shaping or Dividing; Work and Tool Holders, Woodworking; Tools; Cutlery; Jacks.	5-3-76
AMUSEMENT, HUSBANDRY, PERSONAL TREATMENT, INFORMATION, GROUP 330—G. M. FORLENZA, Director. Amusement and Exercising Devices; Projectors; Animal and Plant Husbandry; Butchering; Earth Working and Excavating; Fishing, etc.; Tobacco; Artificial Body Members; Dentistry; Jewelry; Surgery; Toiletry; Printing; Typewriters; Stationery; Information Dissemination.	3-1-76
HEAT, POWER, AND FLUID ENGINEERING, GROUP 340—B. R. GAY, Director. Power Plants; Combustion Engines; Fluid Motors; Reaction Motors; Pumps; Rotary Engines and Pumps; Heat Generation and Exchange; Refrigeration; Ventilation; Drying; Temperature and Humidity Regulation; Machine Elements; Couplings; Gearing; Bearings; Clutches; Power Transmission; Fluid Handling and Control; Lubrication.	12-22-75
GENERAL CONSTRUCTIONS, TEXTILES AND MINING, GROUP 350—M. M. NEWMAN, Director. Joints; Fasteners; Rod, Pipe and Electrical Connectors; Miscellaneous Hardware; Locks; Building Structures; Closure Operators; Bridges; Closures; Earth Engineering; Drilling; Mining; Furniture; Supports; Cabinet Structures; Centrifugal Separations; Coating; Textiles; Apparel and Shoes; Sewing Machines.	4-27-76

Expiration of patents: The patents within the range of numbers indicated below expire during December 1976, except those which may have expired earlier due to shortened terms under the provisions of Public Law 690, 79th Congress, approved August 8, 1946 (60 Stat. 940) and Public Law 619, 83rd Congress, approved August 23, 1954 (68 Stat. 764), or which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents..... Numbers 2,914,768 to 2,919,442 inclusive
Plant Patents..... Numbers 1,882 to 1,892, inclusive

REISSUES

DECEMBER 14, 1976

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

NOTE.—A cross reference listing of applications published under the second Trial Voluntary Protest Program is located in the back of this Issue. These entries will be in numerical order by document publication number.

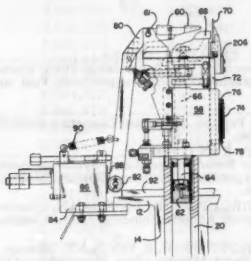
Re. 29,069
PULLING OVER MECHANISM

William C. Lindsey, Milford, Mass., assignor to International Shoe Machine Corporation, Nashua, N.H.

Original No. 3,902,211, dated Sept. 2, 1975, Ser. No. 505,412, Sept. 12, 1974. Application for reissue Apr. 2, 1976, Ser. No. 672,921

Int. Cl.[2] **A43D** *23/00*

U.S. Cl. 12—14.5 **6 Claims**



1. A pulling over mechanism comprising: a support, mounted for heightwise movement between lower and upper support positions, for supporting bottom-down a shoe assembly that includes a last having an upper mounted thereon; a pincers formed of a pair of jaws that are closable towards each other from an open position wherein the jaws are spaced from each other; means mounting the pincers for heightwise movement; pincers closing means operable to impart closing movement to the pincers jaws under a variable force; means retaining the pincers in an upper pincers position; means initially retaining the support in said lower support position; means thereafter raising the support from said lower support position to said upper support position to thereby raise the shoe assembly; means, effective during said rise of the support, to cause the pincers closing means to impart closing movement to the pincers jaws under a relatively light force against the margin of the upper which is inserted between the jaws; control means, effective *no earlier than as the support completes its rise to* [when the support has arrived at] said upper support position, to cause the pincers closing means to impart closing movement to the pincers jaws under a relatively heavy force; and means [thereafter] enabling the pincers to be lowered from said upper pincers position *when the support is in said upper support position.*

Re. 29,070
ATTACHMENT FOR REMOVABLY SUPPORTING A PARTIAL DENTURE

Ralph C. Mays, 1139 N. Gary, Tulsa, Okla. 74110

Original No. 3,672,057, dated June 27, 1972, Ser. No. 89,238, Nov. 13, 1970. Application for reissue June 25, 1974, Ser. No. 483,375

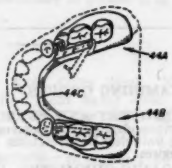
Int. Cl.[2] **A61C** *13/22*

U.S. Cl. 32—5 **16 Claims**

1. An attachment for removably supporting a partial denture to an adjacent natural tooth comprising:

a gudgeon member adaptable to be affixed to a natural tooth including a flat portion extending in the plane of the alveolar ridge adjacent the natural tooth on which a denture is to be positioned, the flat portion having a pinhole therein the axis of which is perpendicular the plane of the flat portion;

a locking bar having a first and second end, the first end having a perpendicular extending integral pin portion of a diameter to be received, when the locking bar is in closed position, in said gudgeon member pinhole, the second end having a hinge pin opening therein, the axis of the



hinge pin opening being perpendicular the plane of the pin portion; and

a hinge pin pivotally received in said locking bar hinge pin opening, the hinge pin being adaptable to be received in a partial denture.

Re. 29,071
AUTOMATIC MACHINE FOR FEEDING AND SEWING SIGNATURES IN BOOKS

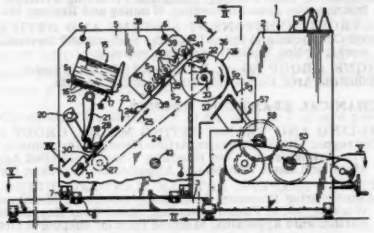
Lorenzo Depetris, Casale Monferrato (Alessandria), Italy, assignor to Smyth Europea S.p.A., Casale Monferrato (Alessandria), Italy

Original No. 3,797,419, dated Mar. 19, 1974, Ser. No. 378,864, July 13, 1973. Application for reissue Dec. 18, 1975, Ser. No. 642,212

Claims priority, application Italy, July 18, 1972, 69329/72

Int. Cl.[3] **B42B** *1/02*

U.S. Cl. 112—21 **4 Claims**



8. [The book sewing machine of claim **1** wherein there are provided:] *In a book sewing machine of the type having:*

a sewing machine part for sewing signatures to form a book, said sewing machine part including:

sewing devices,

a sewing saddle, and

means for moving said sewing saddle reciprocally between a first position adjacent said sewing devices and a second position remote from said sewing devices, and a feeder part including

means for holding a stack of signatures to be sewn into books,

means for removing said signatures from said stack thereof,

means for opening said signatures along the line of the central backbone fold thereof, and

conveyor means for transferring said signatures to said saddle,

the improvement wherein:

said means for moving said sewing saddle operates to move

said saddle in a direction transverse the ridge thereof onto which engages the central backbone fold of said signatures,
said opening means operates on said signatures as they are moved along by said conveyor,
said conveyor means operates to transfer said sewing saddle, and there are provided means for synchronising the movement of said feeder means with said reciprocating movement of said sewing saddle,
two said means for supporting stacks of signatures on said feeder part,
gripper means for withdrawing one signature from each of said stacks and for transferring said two signatures simultaneously onto said conveyor means.
opening means for simultaneously opening both said signatures, and
means for simultaneously placing said two opened signatures astride adjacent parts of said sewing saddle.

Re. 29,072

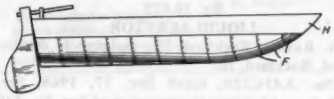
METHOD OF PROTECTING THE HULLS OF MARINE VESSELS FROM FOULING

Klaus Zondek, Vitacura 4312 Depto. 11, Santiago, Chile

Original No. 3,761,334, dated Sept. 25, 1973, Ser. No. 191,233, Oct. 21, 1971. Application for reissue Sept. 9, 1975, Ser. No. 611,633

Int. Cl.² B63B *59/00*

U.S. Cl. 114—222 **22 Claims**



1. A method of protecting the contoured hull of a marine vessel from marine growth which comprises providing a metal foil of anti-fouling metal in strip form and progressively rolling said foil strip into conforming pressure contact with said hull with a layer of adhesive between said foil strip and the hull surface to adhesively bond said foil throughout its area to the exterior surface of said contoured hull below the water line, said foil being sufficiently thin to be easily applied and sufficiently thick to provide protection against fouling for a period of from two to five years.

19. A marine vessel comprising a hull having below the waterline a contoured outer surface and means for protecting said surface from fouling by marine growths or organisms, said protecting means comprising a metal foil of anti-fouling metal covering said outer surfaces of said hull below the waterline and conforming to the contour of said surface and a layer of waterproof adhesive between said foil and said surface to adhesively bond said foil throughout its area to said surface.

Re. 29,073

LIGHT MICROSCOPY PROCESSING APPARATUS

Thomas D. Kinney, 3120 Devon Road, Durham, N.C. 27707, and John E. P. Pickett, 3323 Pinafore Drive, Durham, N.C. 27705

Original No. 3,892,197, dated July 1, 1975, Ser. No. 463,055, Apr. 22, 1974. Application for reissue Aug. 5, 1975, Ser. No. 601,926

Int. Cl.² B05C *3/109*

U.S. Cl. 118—7 **14 Claims**

1. A closed processing system enabling a plurality of individual specimens of tissue to be separately contained while being bathed simultaneously for varying lengths of time in successive selected tissue solutions including melted paraffin so as to fix, dehydrate and clear the specimens preparatory to embedding, comprising:

a. a plurality of uniform tissue receptacles each being adapted to contain and physically isolate a group of tissue specimens having at least one specimen per group, each receptacle having a body portion defining an open cavity adapted to receive and retain specimens and closure means removably received by said body to enclose said cavity, the material forming said receptacles being inert to all of said solutions and having for each of said solutions at least some portion through which each of said solutions may be transferred;

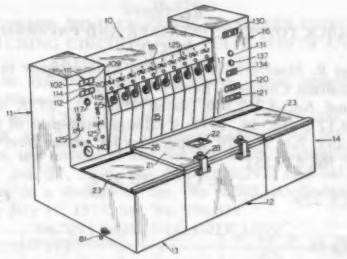
b. a cabinet;

c. an electrically heated, temperature controlled container mounted in said cabinet and having a movable cover and being adapted for melting and holding melted paraffin;

d. a plurality of closed solution containers mounted in predetermined order in a storage compartment in said cabinet proximate said paraffin container, each solution container containing a particular tissue processing solution and with said melted paraffin container collectively containing all of the said tissue solutions in which said specimens are processed;

e. air pump means having associated remotely electrically controllable first valve means mounted proximate said cabinet and associated interconnected piping means, said pump means providing a pressure and vacuum source and said first valve means being selectively operable to connect said source whereby to produce a selected pressure or vacuum condition in said piping means;

f. a processing chamber mounted in said [chamber] *cabinet* and having an end wall immediately adjacent an end wall of said melted paraffin container, said chamber having a pressure sealable top cover and being adapted to receive and process therein selected numbers of said receptacles simultaneously, said chamber being temperature controlled and electrically heated and being connected to said piping means thereby enabling the corresponding selected pressure and vacuum condition in said piping means to be produced in said chamber;



g. a second remotely electrically controllable valve means mounted in said cabinet and having on one side a fluid connection to said chamber and on the other side a fluid connection to said paraffin container enabling the paraffin contents thereof to be exchanged between the chamber and said paraffin container, said fluid connections for said second valve means being of minimal length and being electrically heated and maintained at a temperature above the melting point of said paraffin;

h. a third remotely electrically controllable valve means mounted in said cabinet and having on one side a fluid connection of minimal length to said chamber and on the other side a port for transfer of solutions therethrough;

i. fourth remotely electrically controllable solution transfer valve means positioned in said cabinet between said processing chamber and said storage compartment, said fourth valve means being fluid connected on one side to said third valve transfer port and on the other side having separate fluid connections to each of said solution containers and being remotely electrically controllable for enabling each solution container connection on the one

side of the fourth valve means to be selectively and independently connected to said transfer port for a predetermined time while all other solution container connections are isolated therefrom and at other times to isolate all of said solution container connections from said transfer port;

j. an electrical power source; and

k. remotely operable electrical control means connected to said power source and mounted proximate said chamber for remotely powering and electrically operating each of said valve means and temperature controls in a predetermined time sequence program whereby with a selected number of said receptacles installed in said chamber and said cover sealed on said chamber, said solutions and said paraffin are successively, selectively and independently drawn from said solution and paraffin containers, are measured by timing the withdrawal and admitted to said chamber under a vacuum condition in a predetermined volume, retained for predetermined times at a predetermined pressure and at the end of each processing step being forced back to a respective said solution and paraffin container by pressure from said pump means source in a corresponding processing sequence such that selected of said solutions and said melted paraffin are separately and independently exchanged with each said group of specimens while maintaining said system closed, said paraffin transferred a minimal distance, and each said group physically isolated.

Re. 29,074

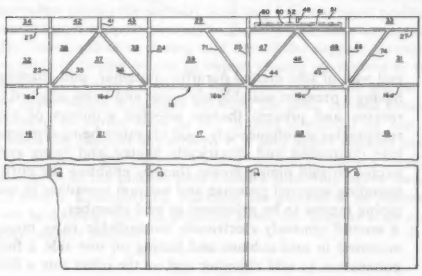
GABLE TOPPED CONTAINER AND PAPERBOARD BLANK

George E. MacEwen, Kansas City, Mo., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Original No. 3,722,780, dated Mar. 27, 1973, Ser. No. 109,177, Jan. 25, 1971. Continuation-in-part of Ser. No. 51,495, July 1, 1970. Application for reissue Nov. 6, 1975, Ser. No. 629,251

Int. Cl.² B65D 5/72

U.S. Cl. 229—17 G 13 Claims



1. In a gable topped container of sheet material comprising a tubular body having four sidewalls, a bottom closure, a pair of opposed roof panels inclining toward each other and overlaying the top of said body, first and second triangular end closure panels being enfolded between said roof panels from the opposite gable ends formed by the latter, a pair of triangular fold-back panels each joined to opposed sides of the [second] *first* triangular end closure panel along fold lines which are in proximity with said roof panels, said fold-back panels being folded against the underside of said roof panels, a separate ridge panel surmounting each of said roof panels and said [second] pair of triangular fold-back panels, [each] *the* pair of ridge panels surmounting the [second] pair of triangular fold-back panels being hinged together at the apex of the contiguous *first triangular* end closure panel and being folded about such hinged joinder in face-to-face relationship between the ridge panels surmounting said roof panels, the [first] *second* triangular end closure panel having an end closure member joined to the roof panels, the ridge panels of the roof panels, and to opposed sides of the [first] *second* triangular end closure panel along fold lines which are in proximity with said roof panels, *the lower portion of* said end closure member being folded against the underside of said roof panels *and the upper portion of said end closure being folded* in face-to-face relationship [with] *between* the ridge panels surmounting said roof panels, the improvement comprising:

the end closure member having an interrupted, weakened line of severance extending transversely across [an] *said* upper portion of said end closure member at an elevation higher than the lowermost edges of the ridge panels with an upper edge of said end closure member being at substantially a common elevation with the uppermost edges of the ridge panels and being sealed to the adjacent ridge panels [of] *surmounting* the roof panels, and

a coating material covering the end closure member at a location about and immediately adjacent the line of severance, said coating material being of a type for preventing sealing of the ridge panels to the portion of the end closure member covered by said [material] coating *material*, said coating material extending at least 5/16 inch below the line of severance over the length of the weakened line of severance.

Re. 29,075

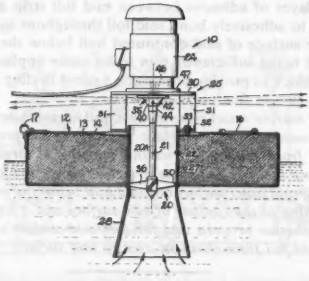
LIQUID AERATOR

Richard B. Ravitts, Rockford, Ill., assignor to Richards of Rockford, Rockford, Ill.

Original No. 3,416,729, dated Dec. 17, 1968, Ser. No. 572,018, Aug. 12, 1966. Continuation of Ser. No. 340,252, March 12, 1973, abandoned. Application for reissue Mar. 18, 1974, Ser. No. 451,990

Int. Cl.² E03B 9/20

U.S. Cl. 239—16 5 Claims



4. In a liquid aerator, the combination of, a support having an upright tubular throat adapted for immersion in a body of liquid at its lower end and defining an opening at its upper end for the discharge of liquid pumped upwardly through the throat, a power rotated shaft carried by said support and extending axially into said throat, an axial flow impeller disposed within said throat and fixed to and rotatable with the lower end portion of said shaft to pump a column of liquid upwardly through the throat in response to rotation of the shaft, said impeller comprising a central hub attached to said shaft, a series of blades radiating outwardly from and spaced equally around said hub with their roots fixed to the hub and with their tips spaced radially inwardly from said throat, each of said blades being twisted longitudinally with a progressively decreasing attack angle from its root to its tip to develop substantially the same volume of flow at all points along the length of the blade, and each blade being formed with upper

and lower surfaces of substantially equal width and extending parallel to one another to cause the velocity of liquid flowing across the upper surface to approximate the velocity of the liquid flowing across the lower surface.

Re. 29,076

TABLET FORMULATION

Ehud Geller, King of Prussia, Pa., assignor to Ives Laboratories Inc., New York, N.Y.

Original No. 3,927,194, dated Dec. 16, 1975, Ser. No. 529,423, Dec. 4, 1974. Division of Ser. No. 312,469, Dec. 6, 1972, Pat. No. 3,883,647. Application for reissue Mar. 15, 1976, Ser. No. 666,560

Int. Cl.² A61J *3/10*; A61K *9/00*

U.S. Cl. 424—15 **11 Claims**

1. A chewable pharmaceutical tablet which is adequately imprinted with indicia or embossing and scored to form a groove which is ½ to ⅝ the depth of the total tablet thickness to facilitate separation into subdivisions containing substantially equal amounts of pharmaceutically active ingredient comprising a directly compressed formulation of:

A. Active ingredient	5 to 10 milligrams
B. Microcrystalline Cellulose	20 to 25 percent by weight
C. Dextrose and corn syrup solids granulation	30 to 55 percent by weight
D. Mannitol	20 to 30 percent by weight
E. Magnesium stearate	0.9 to 1.0 percent by weight
F. The remainder being pharmaceutically acceptable fillers, extenders, flavoring and the like.	

Re. 29,077

TABLET FORMULATION

Ehud Geller, King of Prussia, Pa., assignor to Ives Laboratories Inc., New York, N.Y.

Original No. 3,883,647, dated May 13, 1975, Ser. No. 312,469, Dec. 6, 1972. Application for reissue Mar. 15, 1976, Ser. No. 666,559

Int. Cl.² A61J *3/10*; A61K *9/00*

U.S. Cl. 424—15 **6 Claims**

1. A pharmaceutical tablet which is adequately imprinted with indicia or embossing and scored to form a groove which is one-third to two-thirds the depth of the total tablet thickness to facilitate separation into subdivisions containing substantially equal amounts of a pharmaceutically active ingredient comprising a directly compressed formulation of 5 to 10 milligrams of an active ingredient, the remainder being 45 to 99.7 percent by weight of microcrystalline cellulose and 0.3 to 0.4 percent by weight of magnesium stearate, along with fillers, extenders, flavoring and the like.

Re. 29,078

KEY TELEPHONE SYSTEM

Louis David Tate, Norcross, Ga., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Original No. 3,920,929, dated Nov. 18, 1975, Ser. No. 456,390, Mar. 29, 1974. Application for reissue Feb. 26, 1976, Ser. No. 661,488

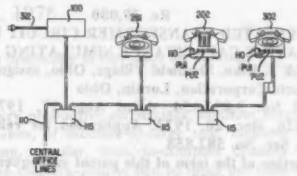
Int. Cl.² H04M *1/00*

U.S. Cl. 179—99 **8 Claims**

8. A control circuit [as in claim 7 wherein] *for use in a telephone system comprising a telephone line, the control circuit, and at least one telephone set including a ringer and a signal lamp, the system having operational modes of idle, ringing, in-use, and hold, the ringing mode being characterized by flashing of the signal lamp and periodic operation of the ringer responsive to the periodic application of ringing voltage to the telephone line, the control circuit comprising:*

counter means activatable to a plurality of states, one of which corresponds to the idle mode;

means responsive to the cessation of ringing voltage for a continuous period of time exceeding the time period of the silent intervals between each application of ringing voltage for advancing the counter means to the state corresponding to the idle mode; and



idle mode logic means responsive to the counter means advancing to said corresponding state for terminating the flashing of the signal lamps, the idle mode logic means [comprises] *comprising* a first logic gate that has a unique output only in response to the counter means advancing to said corresponding state, the unique output serving to disable a second logic gate having as one of its inputs a clock signal that provides the timing of the flashing of the signal lamp.

Re. 29,079

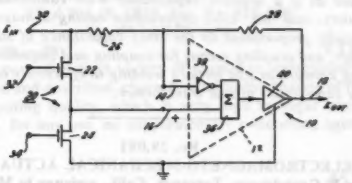
MULTIPLIER, DIVIDER AND WATTMETER USING A SWITCHING CIRCUIT AND A PULSE-WIDTH AND FREQUENCY MODULATOR

Roswell W. Gilbert, Palma de Mallorca, Spain, assignor to Motor Finance Corporation, Dunellen, N.J.

Original No. 3,746,851, dated July 17, 1973, Ser. No. 210,456, Dec. 21, 1971. Continuation-in-part of Ser. No. 184,026, is a division of said Ser. No. 6,075. Application for 6,075, Jan. 27, 1970, Pat. No. 3,626,292, said Ser. No. 184,026, is a division of Ser. No. 6,075. Application for reissue July 17, 1975, Ser. No. 596,818

Int. Cl.² G06G *7/16*; G01R *11/32*

U.S. Cl. 235—194 **24 Claims**



1. A multiplier device comprising a pulse-width modulator controlled by a first input signal, and a pulse height modulator controlled by a second input signal and connected to said pulse-width modulator, said pulse-width modulator comprising source means for producing an output signal alternating between two levels in response to input switching signals, means for modifying at least one of said levels in response to a modulating signal, integrator means for integrating the output of said source means so modified, said source means including a switching device, said device including a high-gain differential amplifier having first and second input terminals, an impedance connected between the first of said input terminals and a third terminal for receiving an input signal, and gating means for connecting the second of said input terminals alternately between said third terminal and a fourth terminal for receiving a signal of a magnitude lower than the input signal applied to said third terminal, level detector means for

detecting the output of said integrator means and producing an output signal change whenever the integrator output reaches either of two different pre-determined levels, and means for transmitting the output of said level detector means to said source means as input gating signals to said source means.

Re. 29,080

COMPENSATED TRANSFORMER CIRCUIT UTILIZING NEGATIVE CAPACITANCE SIMULATING CIRCUIT

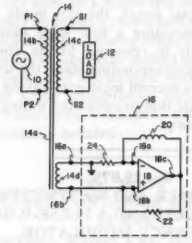
Frederick J. Kiko, Sheffield Village, Ohio, assignor to Lorain Products Corporation, Lorain, Ohio

Original No. 3,832,654, dated Aug. 27, 1974, Ser. No. 426,826, Dec. 20, 1973. Application for reissue June 2, 1975, Ser. No. 582,858

The portion of the term of this patent subsequent to May 6, 1992, has been disclaimed.

Int. Cl.² H03H *7/00, 11/00*

U.S. Cl. 333—24 R **11 Claims**



19. A transformer circuit which provides an uninterrupted path for the flow of primary and secondary current and which compensates for the frequency dependent attenuation of transformer signals that is introduced by the stray capacitance of the windings of the transformer comprising, in combination, a magnetic core, primary, secondary, and tertiary windings disposed on said core, an impedance simulating network including feedback circuitry for establishing voltages and currents which affect the circuitry to which said voltages and currents are applied as if a negative capacitance were connected to said circuitry, said neg ative capacitance having a magnitude substantially proportional to the stray capacitance of said transformer, and coupling means for coupling said impedance simulating network to said tertiary winding to effectively cancel the stray capacitance of said transformer.

Re. 29,081

ELECTROMAGNETO-MECHANICAL ACTUATOR

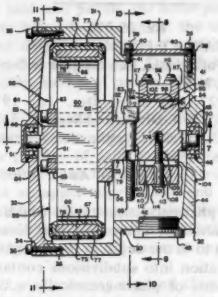
John F. Grundmann, Torrance, Calif., assignor to Moog Inc., East Aurora, N.Y.

Original No. 3,681,726, dated Aug. 1, 1972, Ser. No. 147,381, May 27, 1971. Application for reissue Nov. 28, 1975, Ser. No. 636,049

Int. Cl.² H01F *7/08*

U.S. Cl. 335—228 **15 Claims**

1. An electromagneto-mechanical actuator comprising, a torque motor including a rotor and a stator, and band drive means operatively associated with said motor and including a tensioned flexible resilient band having opposite end portions and an intermediate loop portion, a drum member arranged to pivot with said rotor about the pivotal axis of said rotor and having a cylindrical peripheral surface concentric with said axis, said band intermediate loop portion being wrapped around said surface and secured to said drum member against relative circumferential movement, a yoke member arranged for rectilinear movement along a line perpendicular to said axis, means securing one of said band end portions to said



yoke member, means securing the other of said band end portions to said yoke member, and an output drive element extending from said yoke member.

Re. 29,082

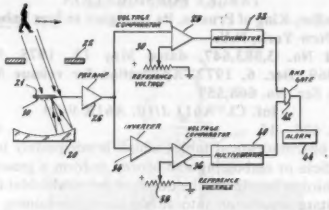
INTRUSION DETECTOR

Frank Schwarz, Stamford, Conn., assignor to Barnes Engineering Company, Stamford, Conn.

Original No. 3,760,399, dated Sept. 18, 1973, Ser. No. 209,660, Dec. 20, 1971. Application for reissue Sept. 12, 1975, Ser. No. 612,883

Int. Cl.² G08B *13/18*

U.S. Cl. 340—258 D **6 Claims**



1. An intrusion detector for generating alternating signals as a result of thermally varying patterns of objects moving across the field of view of the detector comprising

a. a layer of thermal insulating material,

b. a thermopile detector mounted on said layer of insulating material comprised of a plurality of thermocouples of dissimilar metals with all junctions being constantly exposed to the field of view of said detector,

c. said thermocouples being serially connected in rows with adjacent thermocouples in said rows being of alternate polarity

d. said rows of thermocouples being serially interconnected and aligned to form columns of the same polarity thermocouples and adjacent columns of alternate polarity thermocouples, and

e. output terminals connected across said thermopile detector which provides thereat a changing polarity output signal in respect to an object moving across said thermopile detector.

PLANT PATENTS

GRANTED DECEMBER 14, 1976

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

3,987

STRAWBERRY PLANT

Harold A. Johnson, Jr., Watsonville, Calif., assignor to Driscoll Strawberry Associates, Inc., Watsonville, Calif.

Filed Dec. 4, 1975, Ser. No. 637,790
Int. Cl.² A01H *5/03*
U.S. Cl. Plt.—49 **1 Claim**

1. The new and distinct variety of strawberry plant herein described and illustrated, and identified by the characteristics enumerated above.

3,988

APPLE TREE: SIR PRIZE

Daniel F. Dayton, Urbana; James B. Mowry, Carbondale, both of Ill.; L. Frederick Hough, Bloomsbury; Catherine Bailey, Englishtown, both of N.J.; Edwin B. Williams, Lafayette, Ind.; Jules Janick; Frank H. Emerson, both of West Lafayette, Ind., and J. Ralph Shay, Corvallis, Oreg., assignors to Purdue Research Foundation, West Lafayette, Ind.

Filed Dec. 8, 1975, Ser. No. 638,995
Int. Cl.² A01H *5/03*
U.S. Cl. Plt.—34 **1 Claim**

1. A new and distinct apple tree substantially as shown and described particularly characterized by resistance to apple scab, smooth skin, excellent fresh fruit quality characterized by the ability to maintain quality without shrivelling in storage, and outstanding processing ability, said fruit maturing substantially at the same time as "Golden Delicious".

3,989

GRAPEVINE

Fay E. Triplett, 749 E. Keyes Road, Ceres, Calif. 95307

Filed Jan. 14, 1976, Ser. No. 649,419
Int. Cl.² A01H *5/03*
U.S. Cl. Plt.—47 **1 Claim**

1. A new and distinct table-wine variety of grapevine, substantially as illustrated and described, which is vigorous, semi-upright, open, hardy, foliated with medium-size, cordate leaves, and very productive on straight, medium length, medium thick canes, of medium-to-large size, medium length, broad, tapering, regular, loose-to-compact clusters having long stems; the clusters—borne two to three per cane—being short conical in form, and the berries of the clusters being ellipsoidal, strongly adherent, medium size, uniform, black with a thick blue-grey bloom, and having translucent, juicy, greenish flesh, the flesh, of good quality for wine production, being soft, tender, sub-acid, and vinous; the variety being more productive, with larger clusters, and ripening earlier than the Ruby Cabernet.

3,990

ROSE PLANT SEEDLING NO. 71-86L

Roy L. Byrum, Richmond, Ind., assignor to Joseph H. Hill Company, Richmond, Ind.

Filed Jan. 21, 1976, Ser. No. 651,203
Int. Cl.² A01H *5/00*
U.S. Cl. Plt.—22 **1 Claim**

1. A new and distinct variety of rose plant substantially as herein shown and described, characterized by the lavender coloration and strong fragrance of its blooms, which are borne on strong stems of medium length, and by its abundant year around production of flowers of medium large size.

3,991

PLUM TREE

Frederic W. Anderson, Merced, Calif., assignor to The Burchell Nursery, Inc., Modesto, Calif.

Filed Feb. 9, 1976, Ser. No. 656,609
Int. Cl.² A01H *5/00*
U.S. Cl. Plt.—38 **1 Claim**

1. A new and distinct variety of plum tree, substantially as illustrated and described, characterized by the bearing of fruit, of best eating quality, which is very high in sugar content whereby, for any use, no supplementary sweetening agent is required.

PLANT PATENTS

GRANTED DECEMBER 14, 1976

PATENTS

GRANTED DECEMBER 14, 1976

ERRATA

For CLASS	See PATENT NO.
047–001 R	3,996,865
429–194	3,997,362
429–066	3,997,363
204–002.1	3,997,364
429–185	3,997,365
429–144	3,997,366
023–232 E	3,997,416
536–017	3,997,524
536–007	3,997,525

PATENTS

GRANTED DECEMBER 14, 1976

ERRATA

PATENTS

GRANTED DECEMBER 14, 1976

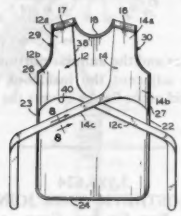
NOTE—A cross reference listing of applications published under the second Trial Voluntary Protest Program is located in the back of this Issue. These entries will be in numerical order by document publication number.

GENERAL AND MECHANICAL

3,996,620
RADIATION SHIELD APRON CONSTRUCTION

Gayle J. Maine, 788 N. Ninth St., Redmond, Oreg. 97756

Filed Mar. 28, 1975, Ser. No. 563,214
Int. Cl.² G21F 3/02; A41D 13/04
U.S. Cl. 2—2 2 Claims



1. A radiation shield apron comprising:

a generally rectangular front shield panel for shielding the front of the body from radiation, said front panel extending continuously vertically from top shoulder line and neckline edges to a generally horizontal bottom edge below body waist level and horizontally to generally vertical opposite side edges, said front panel being of sufficient width to wrap at least partially around the opposite sides of the body when worn,

said front panel including front and back cover sheets of non-shielding fabric material and multiple thin flexible inner sheets of radiation shielding material, said inner sheets being coextensive with said front and back cover sheets and being joined to said cover sheets at least along said top shoulder line, neckline and side edges of said front panel,

a pair of separate seamless one-piece broad back wing panels extending when worn over the shoulder blade portions of the back of the body from the tops of the shoulder to at least waist level, said back wing panels being joined to said front panel at shoulder seams extending substantially full shoulder width along the full length of said top shoulder line edges and at long side seams extending along said vertical side edges of said front panel from just below armpit level to at least waist level so as to define with the connected said front panel a pair of arm openings between said shoulder and side seams,

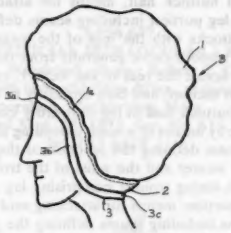
each of said back wing panels being of double thickness, high-strength, non-shielding fabric material and including a generally vertically extending inner edge extending from an inner end of one of said shoulder seams downwardly and gradually inwardly toward the center of the back, and a bottom edge extending in an arc upwardly and inwardly from a lower end of one of said side seams toward the center of said back,

said inner edge and said bottom edge of each said back wing panel converging near the center of the back at about waist level and then extending generally parallel and in spaced relationship across the back to define a wide, flat and long tie band portion forming an integral seamless one-piece cotinuation of said back wing panel, such that there are no seams between said tie band portion and other portions of said back wing panel, each said tie band portion being of sufficient length to be tied at waist level at the center of said front panel with the other said tie band portion so as to draw said back wing panels together in overlapping relationship at the center of the back, such that said tie band portions when drawn snugly across the back and tied together at the front of the apron exert forces tending to wrap said front panel closely around the sides of the body and maintain said front and back panels close to the body to distribute the weight of said front panel over a wide body area including the chest, shoulders, back, waist and hips.

3,996,621
BATHING CAP

Liselotte Martienssen, Hamburg, Germany, assignor to Hauni-Werke Korber & Co., KG, Hamburg, Germany

Filed Jan. 28, 1975, Ser. No. 544,778
Claims priority, application Germany, Feb. 15, 1974, 2407215
Int. Cl.² A42B 1/12
U.S. Cl. 2—68 10 Claims



1. A waterproof bathing cap, comprising an endless elastic band which is expansible to sealingly engage the skin around the hair-covered area of the head of a wearer, said band including a first elongated planar section the planar surface of which is located in a first plane and engages the forehead of the wearer below the hairline when the cap is in use, a second elongated planar section, the planar surface of said second section being located in a second plane inclined with respect to said first plane and engages the nape of the wearer below the hairline when the cap is in use, and two additional elongated sections which engage the temples and the cheeks of the wearer in front of the ears when the cap is in use, each of said additional sections being integral with one of said first section and with one end of said second section, all of said sections can be placed into a common plane when said band is severed transversely across any one of said sections and, when said band is severed transversely across and substantially midway between the ends of said second section, said first section is located between said additional sections, said additional sections are substantially mirror images symmetrical to each other and extend outwardly from the respective ends of said first section and make an angle greatly exceeding zero but less than 180°, and the halves of said second section extend outwardly from the respective ends of the corresponding additional sections (additional sections being inclined with respect to said first and second sections); a large deformable pouch loosely confining the hair of a wearer, said pouch being spaced apart from said band when the cap is applied to the head of a wearer and having an opening facing said band; a deformable endless intermediate portion extending between said band and the opening of said pouch; and means for sealingly securing said intermediate portion to said band and to said pouch in the region of said opening.

3,996,622
FORM-FITTING TROUSERS

Ann V. Cooke, 45 Millbrook Lane, St. Louis, Mo. 63122

Continuation-in-part of Ser. No. 350,724, April 13, 1973, abandoned. This application Apr. 21, 1975, Ser. No. 569,840
Int. Cl.² A41D 1/06
U.S. Cl. 2—227 9 Claims

1. A buttock-fitting trouser comprising leg portions and a separate seat portion, said seat portion having a right buttock half and a left buttock half, means for attaching said seat portion to the leg portion including seams defining the junction of the buttocks with the legs of the wearer, said seams extending in a smooth curve generally from the crotch, laterally outwardly across the rear of the wearer, around the sides and to the front thereof, and then upwardly to the waist of the trouser, each buttock half being outwardly convexly shaped, at least in part, by means of a seam extending at least part way between the seam defining the junction of the buttocks with the legs of the wearer and the waist of the trouser.

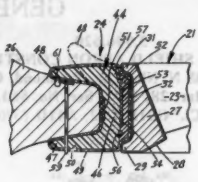
7. A buttock-fitting trouser comprising leg portions and a separate seat portion, means for attaching said seat portion to the leg portions including seams defining the junction of the buttocks with the legs of the wearer, said seat portion further comprising a right buttock half and a left buttock half, each buttock half of said trouser having an inner panel and an outer panel each preshaped to provide for said buttock-fitting, the inner panels of the buttock halves being joined to form a seam at their junction extending from generally the crotch to the waist of the trouser, and the inner and outer panels of each of the buttock halves being joined by a seam extending from the seam defining the junction of the buttocks with the legs of the wearer to the waist of the trouser, said last named seam being curvalinear and outwardly convexly shaped at least at a lower portion thereof whereby when said inner and outer panels forming each buttock half are seamed together said assembled inner and outer panels present an outwardly convex configuration, said last named seam cooperating with said seams defining the junction of the buttocks with the legs of the wearer to define a preshaped outwardly convex seat portion smoothly contoured to fit the buttocks of the wearer.

3,996,623
METHOD OF IMPLANTING A PROSTHETIC DEVICE AND SUTURING MEMBER THEREFOR

Robert L. Kaster, 2730 Vagabond Lane, Wayzata, Minn. 55391

Continuation of Ser. No. 493,027, July 30, 1974, abandoned. This application June 30, 1975, Ser. No. 591,428
Int. Cl.² A61F 1/22, 1/00
U.S. Cl. 3—1.5 10 Claims

5. A method of implanting a prosthetic device on an annular portion of tissue surrounding an opening in a body with a suturing member having a radial outwardly directed first annular flange and a radial outwardly directed second annular flange spaced from the first flange forming an annular groove between said flanges for accommodating the annular portion of tissue comprising: positioning the device carrying the suturing member in the opening in the body at about the midpoint of the annulus of the opening, locating an annular portion of the tissue surrounding the opening in the annular groove between said first and second annular flanges, placing stitches

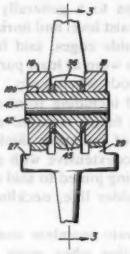


in one of said flanges and the annular portion of the tissue, and tying said stitches adjacent the inside of the other of said flanges whereby said other flange covers the knots and ends of the tied stitches.

3,996,624
PROSTHETIC KNEE JOINT

Douglas G. Noiles, New Canaan, Conn., assignor to United States Surgical Corporation, New York, N.Y.

Filed Feb. 28, 1975, Ser. No. 554,144
Int. Cl.² A61F 1/24
U.S. Cl. 3—1.911 12 Claims



1. A prosthetic device for joining a pair of human or animal bones having a concentric bearing system which retains its concentricity with wear comprising:

a first prothesis having a condylar portion and a fixation portion, said condylar portion including two laterally spaced apart condyloid elements each having a first bearing surface defined by the outer periphery of said element and a second bearing surface defined by an opening in said element adapted to receive a transverse support shaft, said fixation portion being adapted to be fixed to one of said bones, said first and second bearing surfaces being concentric and part of the same unitary mechanical element and being adapted to support weight or be subjected to force while experiencing relative motion;

a second prosthesis having a weight-bearing portion and a fixation portion, said weight-bearing portion including mating bearing surfaces against which said first bearing surfaces of said elements of said first prosthesis bear, said weight-bearing portion having a center portion fitted between the condyloid elements of said first prosthesis, said center portion having an opening adapted to receive a transverse support shaft, said fixation portion being adapted to be fixed to the other one of said bones; and

a transverse support shaft having a central portion positioned in said opening in said center portion of said second prosthesis and end portions received in said openings in said condyloid elements in said first prosthesis, said shaft being non-rotatably mounted relative to said second prosthesis, said end portions of said shaft being adapted

to rotate in said openings in said condyloid elements while bearing against said second bearing surfaces.

3,996,625

ARTIFICIAL HIP JOINT WITH NOVEL STEM

Douglas G. Nolles, New Canaan, Conn., assignor to United States Surgical Corporation, New York, N.Y.

Filed Feb. 28, 1975, Ser. No. 554,126
Int. Cl.² A61F 1/24
U.S. Cl. 3—1.912 7 Claims

1. An artificial hip joint comprising an acetabulum prosthesis of the cotyloid cavity defining a socket and a femoral prosthesis including a pin adapted to be driven into the bone-marrow channel of the femur, a neck integrally connected to the pin and a hip ball secured to the neck and movably interconnected with said acetabulum prosthesis, said pin having a proximal portion tapered away from the joint and a distal portion having a plurality of circumferentially spaced longitudinal flutes, said flutes having a longitudinally extending cutting edge adpated to cut into the inner wall of the bone-marrow channel, said pin further having a plurality of longitudinally spaced recesses located on the surface of said pin, said recesses comprising slots or a plurality of holes extending transversely of said pin, said recesses being only located on the surface of the pin at points which are intersected by a plane which is perpendicular to an imaginary plane passing through the centers of the hip ball, neck and pin of the femoral prosthesis, said pin further having a longitudinal slot extending away from the distal end toward the joint, said slot extending completely through the distal portion of the pin and dividing the distal portion into a pair of flexible sections so that the sections may move inwardly and outwardly relative to each other.

3,996,626

ARTIFICIAL INTRAOCULAR LENS

William Richards, Medway, and Bernard Grolman, Worcester, both of Mass., assignors to American Optical Corporation, Southbridge, Mass.

Continuation-in-part of Ser. No. 606,032, Aug. 20, 1975, abandoned. This application Sept. 22, 1975, Ser. No. 615,275
Int. Cl.² A61F 1/24
U.S. Cl. 3—13 12 Claims

1. A pseudophakos comprising:

a lens of material suitable for implantation in the eye and having a number of openings of a predetermined diametral size extending thereinto;

an iris clip formed of a length of wire, at least one end of which is extended into one of said openings, said end of said length of wire terminating with an enlargement of substantially greater cross-sectional size than the diametral size of said opening and being embedded in a surround of the material of said lens, said surround locking said iris clip in place.

3,996,627

ARTIFICIAL INTRAOCULAR LENS

Emil W. Deeg, Woodstock, Conn.; Robert E. Graf, and David A. Krohn, both of Southbridge, Mass., assignors to American Optical Corporation, Southbridge, Mass.

Filed Sept. 22, 1975, Ser. No. 615,276
Int. Cl.² A61F 1/16
U.S. Cl. 3—13 10 Claims

6. A glass lens being of high chemical durability with freedom from toxicity and radioactivity, of low density from about 2.46 to 3.05 g/cc and having a coefficient of expansion ($℃^{-1}$) approximately 40×10^{-7} suitable for intraocular implantation and having spectral transmission characteristics simulating the optical absorption of human crystalline lenses wherein the composition of the glass consists essentially of the following ingredients in the range of weight percent:

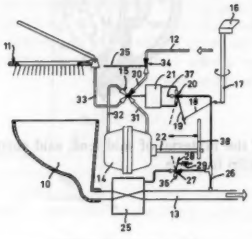
SiO_2	38.1 to 38.7
TiO_2	22.3 to 23.8
ZrO_2	4.1 to 4.5
La_2O_3	0 to 2.1
B_2O_3	2.9
Fe_2O_3	0 to 2.0
ZnO	1.7
CaO	1.0
SrO	1.2
MnO	.1 to 2.0
BaO	3.5 to 5.0
Na_2O	18.6
CeO_2	0.3 to 5
CuO	0 to .05

3,996,628

WATER CLOSETS

Karl Allan Bonde Möllerstedt, Fjalkinge, Sweden, assignor to IFO AB, Bromolla, Sweden

Filed July 3, 1975, Ser. No. 592,795
Claims priority, application Sweden, July 4, 1974, 7408808
Int. Cl.² E03D 3/00, 11/00
U.S. Cl. 4—26 6 Claims



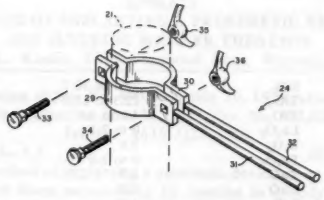
1. A water closet comprising a closet pan, a flushing cistern in the form of a closed container, a movable wall in said container shiftable by water in the container, said wall dividing said container into a first conpartment and a second compartment separated from said first compartment, a valve mechanism, conduits extending from said first and second compartments in said container to said valve mechanism and from said valve mechanism to a source of water under pressure and to the flushing device of said closet pan, said valve mechanism being operative by manual actuation means, and connecting said second compartment of said container to said source of water under pressure and said first compartment to said flushing device of said closet pan, with the result that said movable wall is shifted by the water in the said container which flows into said second compartment and forces the water present in said first compartment into said flushing device of said closet pan, and means coupled between said valve mechanism and said movable wall to actuate said valve mechanism upon movement of said movable wall such that said first compartment is connected to said souce of water under pressure for filling and the water present in said second compartment is forced into said flushing device of said closet pan.

3,996,629

DEMAND TYPE FLUSH TANK CONTROL

Rudolph T. Riedel, 7198 Sugarbin St., Orlando, Fla. 32807

Continuation-in-part of Ser. No. 519,183, Oct. 30, 1974, abandoned. This application Sept. 2, 1975, Ser. No. 609,306
Int. Cl.² E03D 3/12
U.S. Cl. 4—67 R 19 Claims



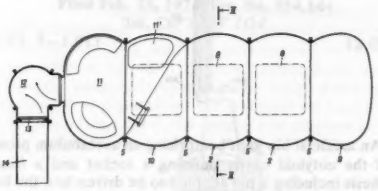
1. A demand type restraint device for preventing the utilization of an unnecessary amount of water in the flushing of a toilet of the type having a water storage tank, a handle movable to bring about a lifting of the water release valve from its seat to accomplish a flushing of the toilet, and an overflow pipe mounted near the valve seat, said device comprising a clamping portion and a restraint portion, said clamping portion being of a construction such that it can be removably secured to overflow pipes of various sizes, with said restraint portion comprising a pair of spaced apart, relatively adjustable arms extending in the path of travel of the water release valve and serving to restrict the upward movement of the water release valve to some extent when the handle is manipulated, said restraint portion allowing said water release valve to move away from its seat during handle manipulation for a sufficient amount that some of the water in the tank can be utilized in flushing the toilet, said restraint portion directly contacting said water release valve at a location lower than the point at which the flow of water would continue after the handle has been released.

3,996,630

UNDERGROUND SWIMMING-BATH

Alfons Maderna, Maysedergasse 4, 1010 Vienna, Austria

Filed Mar. 24, 1975, Ser. No. 561,208
Claims priority, application Austria, Mar. 25, 1974, 2469/74
Int. Cl.² E04H 3/16, 3/18; F16L 22/02
U.S. Cl. 4—172.19 6 Claims



1. An underground swimming-bath completely embedded in the ground, comprising:

at least one central unit, comprising a basin part including a bottom wall and side walls, a pair of side parts connected to extend upwardly from said basin part side walls, and a ceiling part connected to extend between the upper ends of said side parts;

a blind closure unit connected to one end of said central unit (s);

an entrance closure unit connected at one end thereof to the other end of said central unit (s);

entrance means connected to the other end of said entrance closure unit;

all of said units being made of glassfiber reinforced plastic material, and the side walls of said basin part, said side parts, said ceiling part(s), and the walls of said blind closure unit and said entrance closure unit being curved outwardly in two directions normal with respect to one another whereby they arch outwardly toward the surrounding ground in which said units are embedded; and

a concrete layer on the outside of all of said units.

3,996,631

SAFETY DEVICE FOR USE IN BATHROOMS WITH BATHTUBS

Samuel P. Fields, Fordland, Mo., assignor to The Raymond Lee Organization, Inc., a part interest

Filed July 21, 1975, Ser. No. 597,551
Int. Cl.² A47K 17/02
U.S. Cl. 4—185 H 5 Claims

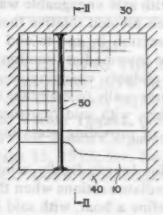
1. A safety device for use in bathrooms with bathtubs, comprising:

an elongated, vertical, pole extending between the floor and ceiling of the bathroom near the bathtub;

an elongated rail hingedly attached at one end to a bath-

room wall adjacent the bathtub so as to be pivotable in the vertical plane that includes the pole and extends transversely across the tub;

a bracket attached to the pole to support tae free end of the rail when the rail is pivoted to a horizontal position; and



a clip attached to the bathroom wall directly above the hinged end of the rail to detachably secure the rail in a vertical position.

3,996,632

DETACHABLE COUPLING

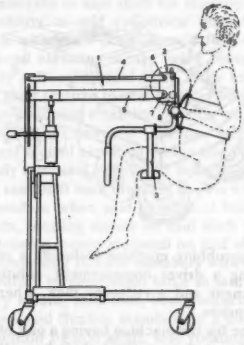
Anna Christina Bakker née Viel, 28, van Galenlaan in Doorn, Netherlands

Filed June 17, 1975, Ser. No. 587,686

Claims priority, application France, June 17, 1974, 74.21954

Int. Cl.² A61G 7/10

U.S. Cl. 5—83 7 Claims



1. In a lifting device for lifting sick persons and invalids, a detachable coupling which includes: a first coupling element for selective attachment to said lifting device, said first coupling element comprising two parallel interconnected jaw plates with hook means at their upper end and with clamping means at their lower end, a supporting element for supporting the person to be lifted, a second coupling element detachably connected to said supporting element and comprising an elongated bar with engaging means for cooperation with said hook means, said plates being so spaced from each other that said elongated bar fit therebetween when said engaging means cooperate with said hook means, and cam means arranged at the lower portion of said bar for engagement by said clamping means when said first and second coupling elements are in coupled position.

3,996,633

WATERBED BEDCLOTHES

Carol E. Burke, 13825 E. 35th Court, Independence, Mo. 64055

Filed Nov. 24, 1975, Ser. No. 634,822

Int. Cl.² A47G 9/00

U.S. Cl. 5—334 C 6 Claims

1. A fitted mattress cover for rectangular waterbed mattresses having spaced upper, lower, side and end surfaces and corners, said cover comprising:

a. a substantially rectangular flat panel member having upper, side and end surfaces, side edges, end edges, and corners;

b. said panel member being adapted to overlie a mattress upper surface with the side and end surfaces of the panel member overlying an upper portion of the surfaces of the mattress sides and end respectively;

c. a triangular pocket member at each corner of the panel member and connected to side and end edges of the panel member forming pockets for receiving a waterbed mattress corner therein, said pocket member having first and second edges and a free edge, said first and second edges being respectively connected to one of said panel member end edges and one of said panel member side edges whereby said first and second edges extend from a respective corner of the panel member;

d. a portion of said pocket member being longitudinally extensible and adapted for resilient engagement with a lower corner surface of said mattress;

e. an elastic strip connected to said pocket member free edge, said elastic strip having ends connected to said panel member one end edge and one side edge respectively; and

f. said elastic strip being in an extended condition when connected to said pocket member free edge and said panel member one end edge and one side edge, whereby the pockets cooperate with the water in the mattress to retain the engagement of the pocket on the mattress corners and thereby retain the panel members in covering relation to the upper surface of the mattress.

3,996,634

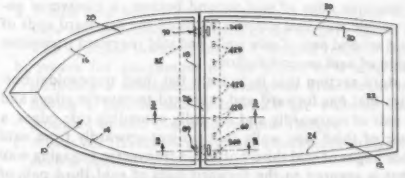
SECTIONAL BOAT

Robert E. Grind, 512 Fairview Drive, Placerville, Calif. 95667

Continuation-in-part of Ser. No. 474,611, May 30, 1974, abandoned. This application Nov. 24, 1975, Ser. No. 634,788

Int. Cl.² B63B 7/04

U.S. Cl. 9—2 S 13 Claims



1. A multiple section boat comprising:

a plurality of boats sections, each having at least a bottom and a plurality of boat sides, each section being separately buoyant;

the rearward boat side of each section, except the rearward most section, being attachable to the forward boat side of the next adjacent rearward section;

the forward boat side of each said section, except the forward-most section, being attachable to the rearward boat side of the next adjacent forward section;

a plurality of spacer strips between said adjacent attachable boat sides;

a bolt means for attaching said adjacent boat sides and for carrying vertical shear forces between said adjacent boat sides;

slot means in the forward end of the bottom of each said section except in the forward-most section;

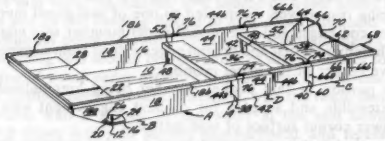
a fixture having upstanding tabs thereon, extending from the rearward end of the bottom of each said section except the rearward-most section, said tabs being aligned with a plurality of slots in said slot means on the next adjacent said section and being bent forward to engage said slots at the root of the bend of said upstanding tabs to carry tension forces between said adjacent sections.

3,996,635

NESTABLE MULTI-SECTION BOAT ASSEMBLY

Gerald S. Wilkes, and Helen Elaine Wilkes, both of 20736 S. Elaine, Lakewood, Calif. 90715

Filed July 11, 1975, Ser. No. 595,223
Int. Cl.² B63B *7/00*
U.S. Cl. 9—2 S **4 Claims**



1. A compact portable multi-section boat assembly in which the sections thereof may nest one within the other for transportation or to be disposed end-to-end in removable interlocking relationship to provide a boat, said assembly including:

a. a bow section that includes a flat first trapezoidal bottom that has forward and rearward transverse edges between which a pair of rearwardly and inwardly extending side edges extend, a bow member that extends upwardly and forwardly from said forward edge, a pair of first sidewalls that project upwardly from said side edges and are connected to said bow member, and a transverse engageable wall that is secured to said rearward edge of said bottom and the rearward edges of said side walls;

b. an intermediate section that includes a flat second trapezoidal bottom that has forward and rearward transverse edges and a pair of rearwardly and inwardly extending side edges, a pair of second sidewalls that project upwardly from said side edges of said second bottom, a transverse engaging wall that is secured to the forward ends of said second pair of side walls and to said forward transverse edge of said second bottom, a transverse engageable wall that extends between the rearward ends of said second pair of side walls and said rearward transverse edge of said second bottom;

c. a stern section that includes a flat third trapezoidal bottom that has forward and rearward transverse edges and a pair of rearwardly and inwardly extending side edges, a pair of third side walls that project upwardly from said side edges of said third bottom, a transverse engaging wall that is secured to the forward ends of said third pair of sidewalls and to said forward transverse edge of said third bottom, and a transom that is secured to said rearward edge of said third bottom and to rearward edges of said third side walls, said intermediate section capable of being disposed between said bow section and stern section, with said engageable transverse wall of said bow section and engaging transverse wall of said intermediate section when pivoted relative to one another capable of removably interlocking to hold said bow section and intermediate section in end-to-end longitudinal relationship, and said engaging wall of said stern section capable of interlocking with said engageable wall of said intermediate section when pivoted relative thereto to removably hold said stern section in end-to-end longitudinal relationship with said intermediate section;

d. first means for slidably engaging said engageable and engaging transverse walls to maintain the latter in interlocked relationship, with said first means also serving a second function of providing seats for the user of said boat; and

e. second means for longitudinally reinforcing said bow, stern and intermediate sections when they are removably interlocked to define a boat, with said bow, intermediate and stern sections being of such transverse area that they may be nested one within the other when said boat assembly is being transported on land and said second means including:

1. a plurality of axially alignable hollow rails on the upper extremities of the pairs of side walls of said bow, intermediate and stern sections that extend outwardly therefrom; and

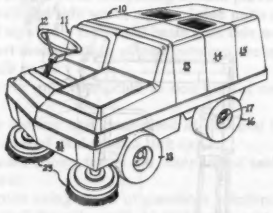
2. a plurality of slide bolts that extend between and removably engage said hollow rails when said bow, intermediate and stern sections are longitudinally aligned end-to-end to define a boat.

3,996,636

FLOOR SCRUBBING MACHINE

Walter G. Ashton, Winnetka, Ill., assignor to Star Industries, Inc., Highland Park, Ill.

Filed Dec. 17, 1975, Ser. No. 641,499
Int. Cl.² A47L *11/283*; **A44L** *11/293*
U.S. Cl. 15—50 R **8 Claims**



1. In a floor scrubbing machine including a self-propelled vehicle providing a driver compartment, solution tanks, a motor compartment and a recovery tank, wherein the improvement comprises

a. a main frame for the machine having a pair of rear wheels rotatably mounted on a fixed shaft beneath the motor compartment of the vehicle,

b. an undercarriage mounted beneath a portion of said main frame,

c. means connecting said undercarriage to said main frame of the vehicle for pivotal movement relative thereto,

d. driving wheels for said vehicle carried by said undercarriage for steering and propelling the vehicle as directed by the driver thereof,

e. means under the control of the driver for turning said undercarriage through a horizontal plane relative to the vehicle,

f. a plurality of scrubbing brush and squeegee assemblies carried by the undercarriage and adapted for movement independently of the vehicle,

g. means for moving said scrubbing brush and squeegee

assemblies through a substantially vertical component relative to said undercarriage, and

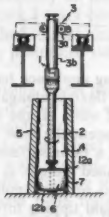
h. a sweeping broom carried by said undercarriage and movable with said scrubbing brush and squeegee assemblies through a substantially vertical component relative to said undercarriage.

3,996,637

APPARATUS FOR CLEANING THE INSIDE OF INGOT MOLDS OR OTHER HOLLOW BODIES HAVING INTERIORS OF VARYING SHAPES AND SIZES

Tatsuo Shibata, and Yoshio Tanaka, both of Kitakyushu, Japan, assignors to Iri-E Kosan Corporation, Fukuoka, Japan

Filed June 13, 1975, Ser. No. 586,682
Int. Cl.[2] B08B 9/08; B22D 43/00
U.S. Cl. 15—56 10 Claims



1. Apparatus for cleaning the inside of hollow bodies of varying sizes and shapes such as ingot molds and the like, comprising an elongated cylindrical body, first elevating means for raising and lowering said cylindrical body between a raised and a lowered position, a shaft concentrically disposed in said cylindrical body, said shaft being telescopically mounted in said cylindrical body for longitudinal displacement relative to said cylindrical body, second elevating means operably connected to said shaft for telescopically extending said shaft relative to said cylindrical body between an extended and a withdrawn position, said first elevating means and said second elevating means being operable to simultaneously lower said cylindrical body while telescopically extending said shaft relative to said cylinder body such that said shaft is extended to said extended position when said cylindrical body reaches its lowered position, said first elevating means and said second elevating means also being operable to simultaneously raise said cylindrical body while telescopically withdrawing said shaft such that said shaft is withdrawn to said withdrawn position when said cylindrical body reaches said raised position, rotating means on said shaft for rotating the latter, and cleaning means mounted on said shaft, said cleaning means comprising flexible members which are projected radially outwardly by centrifugal force as said shaft is rotated by said rotary means, said shaft being telescopically extendable to dispose said flexible members in a hollow body such that upon rotation of said shaft, said rotating and projected flexible members are operable to clean the inside of said hollow body.

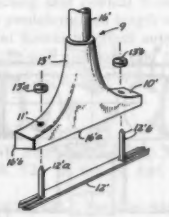
3,996,638

MOP HOLDER HAVING SLIDEABLE JAW

Leonard J. Scarola, 1252 E. 53rd St., Brooklyn, N.Y. 11234

Filed Aug. 1, 1975, Ser. No. 601,151
Int. Cl.[2] A47L 13/24
U.S. Cl. 15—151 1 Claim

1. A mop holder comprising a mop clamping means for detachably clamping and securing a mop and for detachably receiving a handle, including a base support structure defining an elongated lineally-extending handle receptacle of predetermined long length, and having a substantially flat inclined lower seating face having a length extending laterally in opposite directions along a linear path substantially horizontally transversely to a longitudinal axis of the elongated handle receptacle and defining at least two spaced-apart anchoring apertures in the seating face, and the flat lower seating face having leading and trailing edges, the leading edge being a predtermined distance lower than the trailing edge relative to said longitudinal axis; and anchoring structure including an elongated strip having a substantially flat upper face adjacent and opposite ends thereof integral spaced-apart anchoring



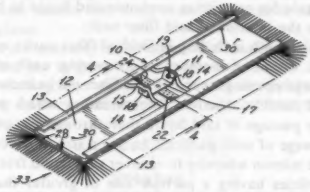
projections bent upwardly the distal ends of the respective anchoring projections being pointed for piercing mop heads, said spaced apart apertures extending through upper surfaces of the base structue, a pair of lock washer elements, the washer elements being slidably lockable on the anchoring projections after the latter are inserted through the base apertures to secure the anchoring strip to the base support structure, the holder adapted to accommodate mop heads of various widths.

3,996,639

DUST MOP WITH PEEL-OFF MOP HEAD

Dana K. Griffin, 24714 Madison Court, Apt. 296, Farmington, Mich. 48024, and John R. Wilson, 3203 E. Bradford Drive, Birmingham, Mich. 48010

Filed Aug. 28, 1975, Ser. No. 608,518
Int. Cl.[2] A47L 13/255, 13/46
U.S. Cl. 15—229 B 8 Claims



1. In a dust mop having a mop handle, the combination comprising:

a. a dust mop head frame substantially rectangular in plan view and provided along each of the longer edges thereof with opposed inwardly facing C-shaped retainer flanges;

b. means for attachment of the frame to a mop handle including a substantially rectangular attachment bridge having a pair of side rods which are endwise slidably mounted in said C-shaped retainer flanges;

c. means for fixedly securing said attachment bridge to the central portion of said frame;

d. a dust mop head, including a dust mop element on the lower side thereof, and a fiber cloth backing material on the upper side thereof; and

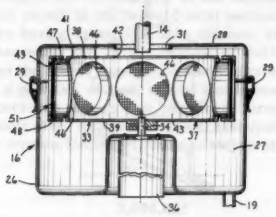
e. releasable fastening means on the lower side of said frame for releasably attaching said dust mop head frame to said dust mop head.

3,996,640

FILTERING MECHANISM

Maurice R. Blue, 60960 Crown Court, South Bend, Ind. 46614; Landon Hudson, 608 Aldridge Drive, and Ralph G. McCauley, 3113 Mayfair Drive, both of Kokomo, Ind. 46901

Filed Oct. 15, 1974, Ser. No. 514,362
Int. Cl.² A47L 11/30
U.S. Cl. 15—320 7 Claims



6. A filtering system for removing contaminating solid particles from a floor-cleaning liquid, comprising:

a centrifugal filter device for removing solid particles from said liquid, said filter device including a substantially stationary hollow casing defining an interior compartment therein and a filter unit disposed within said compartment and rotatable relative to said casing, said filter unit being mounted for rotation about a substantially vertical axis;

said filter unit comprising a hollow drumlike member having spaced upper and lower walls joined by a substantially annular sidewall, said annular sidewall having a plurality of radially directed, individual, discharge openings extending therethrough, said discharge openings being angularly spaced from one another circumferentially of said sidewall, said topwall having an inlet opening formed therein for permitting contaminated liquid to be supplied into the interior of said filter unit;

said filter unit including individual filter packs mounted on said drumlike member and covering each of said discharge openings, each of said filter packs including a thin and flexible sheetlike filter member which permits the free passage of said liquid therethrough but prevents the passage of solid particles having a size in excess of about one micron whereby to recover said liquid free from solid particles having a particle size of greater than about 1 micron and a condition suitable for reuse, each of said filter members being sandwiched between a pair of meshlike support screens positioned on opposite sides of said sheetlike filter member for supporting same;

a plurality of individual ringlike caps removably attached to said drumlike member in alignment with said discharge openings, said caps coacting with said drumlike member for clamping said filter packs therebetween in positions wherein said filter packs extend across said discharge openings;

first tank means for containing therein a contaminated liquid containing solid particles, said first tank means being in communication with the inlet opening associated with said filter unit for permitting said contaminated liquid to be supplied thereto; and

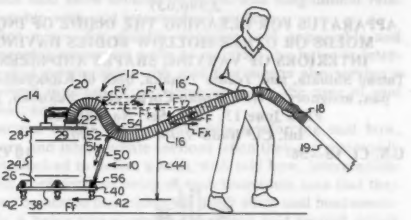
second tank means for receiving the filtered liquid, said second tank means being in communication with the compartment defined by said casing.

3,996,641

TIPPING FORCE REDUCING APPARATUS

Arthur H. Eichholz, Polo, Ill., assignor to Central Quality Industries, Inc., Polo, Ill.

Filed Apr. 28, 1975, Ser. No. 572,612
Int. Cl.² A47L 9/00
U.S. Cl. 15—339 11 Claims



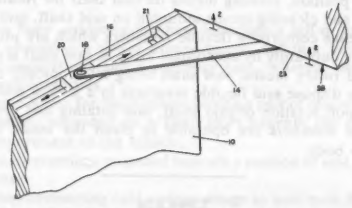
1. In a work performing appliance having an upright body with a base and a top, a flexible elongate hose connected to, and used to perform the work of, the appliance, and means carried by the body adjacent the base for facilitating movement of the body along a floor surface when pulling forces through the hose are applied thereto, at least a portion of said pulling forces tending to tip the appliance about its base, apparatus for reducing said tipping force comprising: means for connecting one end of the hose to the top for relative rotary motion therebetween; a member having first and second parts for transmitting forces therebetween, said member being flexible for allowing lateral movement of the spaced portion of the hose relative to the hose connecting means and thereby allowing said rotary motion; means for attaching said first part to a portion of the elongate hose spaced from the hose connecting means; and means for positioning the second part of the member to redirect at least a portion of said pulling forces through the hose away from the hose connecting means and to a point below the level of the hose connecting means, said member being of a length so as to prevent the spaced hose portion from movement above said the level of said hose connecting means at all times.

3,996,642

ADJUSTABLE DEGREE DOOR HOLDER

Norman C. Atkins, Franklin Park, Ill., assignor to The Citation Companies, Grand Rapids, Mich.

Filed Feb. 13, 1976, Ser. No. 657,735
Int. Cl.² E05F 5/02
U.S. Cl. 16—82 8 Claims



1. In an adjustable degree door holder having an operating arm with an end pivotably connected to a slide in a channel which is mounted to one of a door and a frame, means for releasably holding the slide stationary at a certain position in the channel, the improvement comprising:

a track for mounting on the other of the door and frame;

a bracket pivotably mounted to another end of the operating arm, the bracket being slidably seated in the track; and

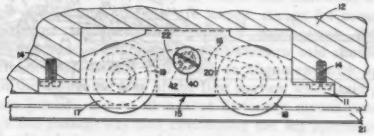
fastening means for adjustably securing the bracket in a fixed position with respect to the track.

3,996,643

ROLLER WHEEL ASSEMBLY FOR SLIDING CLOSURE

Joseph F. Steigerwald, 3240 E. 59th St., Long Beach, Calif. 90805

Filed Sept. 8, 1975, Ser. No. 611,445
Int. Cl.² E05D *13/02*
U.S. Cl. 16—99 6 Claims



1. A roller wheel assembly for use in supporting a slidable closure for motion along a track comprising:

a main frame attached to said closure, said frame having a pair of oppositely positioned side walls which are spaced from each other,

a wheel unit comprising wheel means and a support frame for rotatably supporting said wheel means, said wheel means riding on said track,

means for supporting said wheel unit on said main frame between the side walls thereof, and

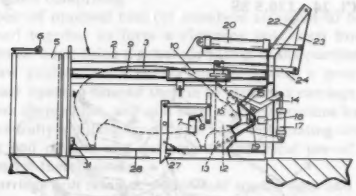
means for continually adjusting the position of said wheel unit relative to said main frame, thereby to raise and lower the closure relative to the track, comprising inclined surface means fixedly attached to the wheel unit support frame having at least one inclined surface the inclination of which runs in a direction substantially transverse to the direction in which the track extends, a wedge assembly having at least one wedge surface which rides on said inclined surface and means for adjusting the position of said wedge assembly along an axis substantially transverse to the direction in which the track extends, whereby said wedge assembly drives against said inclined surface to effect motion of said wheel unit towards and away from said track.

3,996,644

DEVICE FOR RENDERING PIGS UNCONSCIOUS IN AN AUTOMATIC MANNER

Gustav Valfrid Andersson, Dingevall, S-450 53 Hallevadsholm, Sweden

Filed Dec. 9, 1975, Ser. No. 639,106
Claims priority, application Sweden, Dec. 10, 1974, 7415432
Int. Cl.² A22B *3/06*
U.S. Cl. 17—1 A 3 Claims



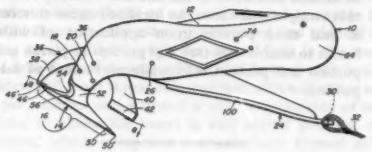
1. An improved device to render pigs unconscious in an automatic manner, said device comprising a chamber arranged to hold one pig at a time, and having a closable opening through which said pig enters, and a closable opening through which said pig exits said chamber, the improvement comprising a conical funnel in said chamber arranged for displacement towards and away from the head of said pig, means for moving said funnel toward and way from said head of said pig, the displacement in the direction towards the head of said pig for receiving said head therein being effected when said pig entrance opening is closed, said funnel comprising a sensor means, a first electrode on said sensor means, a live second electrode on said conical funnel, said first electrode being energized upon its contact with said pig's head and said sensor means cooperates with said second live electrode whereby upon activation of said sensor means said second live electrode is brought into contact with said pig's head, thus rendering said pig unconscious, said moving means comprising means for retracting said conical funnel from the pig's head after lapse of a predetermined length of time, and means cooperating with said funnel to effect automatic opening of said pig exit to remove said pig from said chamber after said predetermined length of time has elapsed.

3,996,645

FISH SKINNING DEVICE

Gerald K. Bordewick, 523 W. 6th St. Apt. 3, Antioch, Calif. 94509

Filed Oct. 9, 1974, Ser. No. 513,304
Int. Cl.² A22C *25/17*
U.S. Cl. 17—66 3 Claims



1. A fish skinning device, comprising:

an elongated handle adapted to be grasped in one hand;

a working head comprising a shank joined to said handle and a sharp beak lying in a common plane with said handle and projecting from the end of said shank remote from said handle in a direction oblique to said handle;

a continuous, concave knife edge commencing at said beak and extending along the edge of said beak adjacent said handle and around an indentation in said shank;

a first jaw projecting from said end of said shank remote from said handle and away from said beak in said common plane;

a second jaw movably mounted on said handle to coact with said first jaw to grasp the skin of a fish; and

a jaw operating lever pivotably mounted on said handle for forcibly moving said second jaw into contact with said first jaw.

3,996,646

CABLE TIE AND METHOD FOR MAKING SAME

Jack E. Caveney, Hinsdale, Ill., assignor to Panduit Corporation, Tinley Park, Ill.

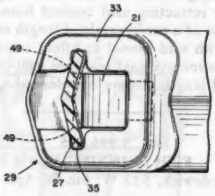
Continuation of Ser. No. 495,012, Aug. 5, 1974, abandoned.
This application Feb. 4, 1976, Ser. No. 655,312
Int. Cl.² B65D *63/00*
U.S. Cl. 24—16 PB 26 Claims

1. A self-locking cable tie for forming a plurality of wires or the like into a bundle, said tie comprising:

a stretched elongate flexible strap portion for positioning about said wires or the like and made of a plastic material comprising stretch-oriented molecules;

a head portion integral with said strap portion extending from one end of said strap portion, having a strap entrance face and a strap exit face, and having a generally transverse aperture extending from said strap entrance face to said strap exit face for receiving the distal end of said strap portion, said aperture having a predetermined strap path therethrough; and

locking means made of non-plastic material and carried by said head portion and having a free end portion extending into said strap path and toward said strap exit face, said free end portion and said strap portion each having an engagable component for causing such a high localized stress concentration in said strap portion that said strap portion is pierced by said free end portion, said engageable component of said free end portion comprising at least one sharply pointed protuberance which extends



foremost into said strap path whereby upon insertion of the distal end of the strap portion into said aperture from said entrance face, the strap portion interferes with and deflects said free end portion to permit tightening of said tie around said wires or the like and whereby said engageable components cause the localized stress concentration in said strap portion upon application of withdrawal forces to enable said free end portion to pierce said strap portion and prevent retrograde movement of said strap portion.

3,996,647

BUTTON INCLUDING A MALE AND FEMALE PORTION

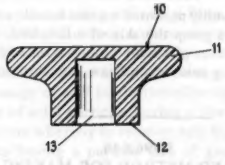
Sigurd Walter Bengtsson, Bruksgatan 17, 414 51 Goteborg, Sweden

Filed June 9, 1975, Ser. No. 585,114

Claims priority, application Sweden, June 12, 1974, 7407731; Sept. 19, 1974, 7411770

Int. Cl.[2] A44B *1/28*

U.S. Cl. 24—90 E 3 Claims



1. A button comprising:

a. a female portion of plastic having at one end an enlarged head for cooperating with a buttonhole, and having a first flat annular face at its other end for engaging fabric, said first flat annular face encircling a cylindrical bore having a sharp cutting edge adjacent to said first face engageable with the fabric; and

b. a male portion of plastic, there being at one end a disk having a second flat annular face for clamping onto fabric in cooperation with said first annular face, said second annular face encircling a cylindrical stud having a smooth outside diameter slightly larger than that of said cylindrical bore and being receivable therein, said cylindrical surface terminating in a sharp cutting edge coactive with said cutting edge of the female portion during assembly to cut the fabric smoothly, the length of said stud being less than the length of said bore.

3,996,648

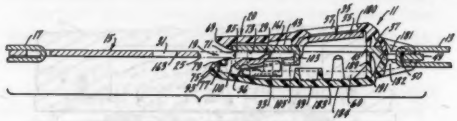
SEAT BELT BUCKLE

Louis Romanzi, Jr., Milford, Mich., assignor to Gateway Industries, Inc., Chicago, Ill.

Filed June 11, 1975, Ser. No. 586,024

Int. Cl.[2] A44B *11/26*

U.S. Cl. 24—230 A 13 Claims



1. A safety belt buckle comprising a tongue plate having an opening therein and an abutment surface, a load beaing buckle body made of metal having one end for connection to a strap for transmitting a load to and from said buckle body, an overhead plate on said buckle body having an opening therein, flanges on said buckle body depending from opposite lateral edges of said overhead plate and terminating in free lower edges spaced apart by a distance substantially equal to the width of said overhead plate, said overhead plate and said depending flanges defining an inverted channel shaped buckle body with a lower opening between said flanges, a unitary latch lever pivotally mounted on said buckle body and located beneath said overhead plate and having an upper end located at said opening, a latch dog on said latch lever having a latch surface for latching engagement with said abutment surface of said tongue plate for transmitting loads between the tongue plate and said latch lever, spring means biasing said latch lever to a latching position in which said latch dog projects into said tongue plate opening and its latch surface abuts said abutment surface on said tongue plate to hold said tongue plate against withdrawal, said latch lever being pivoted for movement to a release position in which said latch dog is retracted from said tongue plate opening allowing withdrawal of said tongue plate, a plastic housing for substantially enclosing said buckle body having a bottom wall covering a bottom side of said buckle at the space between said depending flanges, a side wall on said housing having an entry slot to allow entry of said tongue plate, a top wall on said housing having an access opening permitting pushing and depressing of said upper end of said latch lever and the shifting of said latch lever to said release position.

3,996,649

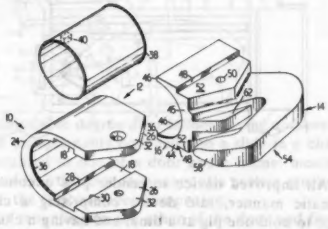
HOOK

Alexander L. Podd, 306 University Ave., Apt. 21, Fredericton, New Brunswick, Canada

Filed May 28, 1975, Ser. No. 581,586

Int. Cl.[2] A44B *13/00*; E04G *3/00*; B66D *3/00*

U.S. Cl. 24—230.5 SS 5 Claims



1. A two piece hook comprising detachably connected first and second portions adapted when joined to slidably engage a tubular member; said first portion comprising a U-shaped

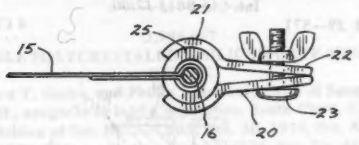
member having a semi-circular section and a pair of elongated, parallel legs extending chordwise therefrom substantially beyond the semi-circular section and having a channelled slideway on the inside of each leg and extending transverse thereto; said second portion having a base and a pair of shoulders extending therefrom, with a semi-circular surface therebetween, said shoulders having a mirrored cross section of said slideways in the elongated legs of the upper portion whereby said shoulders snugly fit within said slideways when the first and second portions are joined; means for securing said portions together comprising a passageway drilled through the base of the second portion below said shoulders and semicircular surface and being in alignment with apertures in the elongated legs of the first portion when said portions are joined; and an elongated fastening means passing through the passageway and connecting the leg apertures to secure said portions together; and a hook integral with and depending from the base of the second section; the semi-circular sections of the portions forming a cylindrical shell when the portions are joined.

3,996,650

FILM RETAINER MEMBER FOR SOLAR HEATER CHAMBER

Martin H. Tonn, Box 39, Amboy, Minn. 56010

Filed Sept. 29, 1975, Ser. No. 617,956
Int. Cl.² A44B *21/00*; F24J *3/02*
U.S. Cl. 24—249 LS **2 Claims**



1. Clamping bracket means for use with lateral and vertical flexible film supporting rails for defining a film enclosure of finite length and having one end thereof opened to atmosphere and the other end coupled to the inlet of a grain drying chamber and comprising:

a. a pair of opposed bracket members arranged to be retained together to form a clamping jaw, each bracket member comprising a generally planar shank portion and a jaw portion, each shank portion having a generally square opening formed therein to receive a carriage bolt shank therewithin, and said clamping jaw portions having a generally semicircular arcuate zone terminating along a free end portion and defining a cylindrical jaw of first diameter therebetween;

b. a carriage bolt retained within said square bore and with nut means grippingly retaining said opposed brackets together with the shank portions in abutting relationship; and

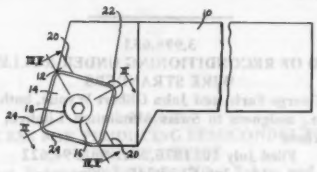
c. split sleeve means having a second diameter which substantially exceeds said first diameter and being fabricated from a resilient member grippingly retained within said cylindrical jaw and arranged to envelope and substantially enclose a flexible film member about a supporting rail.

3,996,651

DEVICE FOR HOLDING A CUTTING INSERT IN THE POCKET OF A TOOL HOLDER

James W. Heaton, and Kenneth L. Neibauer, both of Greensburg, Pa., assignors to Kennametal Inc., Latrobe, Pa.

Filed Sept. 22, 1975, Ser. No. 615,555
Int. Cl.² B26D *1/12*
U.S. Cl. 29—96 **4 Claims**



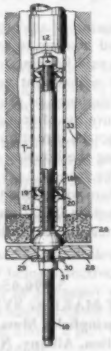
1. In a tool holder for supporting an insert with a central hole therein, said tool holder having a pocket comprised of a bottom wall and side wall for seating the insert therein, a hole formed downwardly through said bottom wall and having the axis offset towards said side wall from the axis of said central hole of the insert, when said insert is seated in said pocket, a pin member having a head on one end adapted to engage the insert from above and the other end threaded and adapted for extending downwardly through the central hole in the insert and said hole formed downwardly in said bottom wall in said tool holder, and a nut threadedly engaged with said other end of said pin member and adapted to abut a lower side of said tool holder to clamp the insert in said seated position, the improvement which comprises a counterbore formed in at least one of the opposing faces of said nut and said holder, said counterbore formed coaxial with said hole in said bottom wall, spring means seated in the counterbore and in unstressed condition projecting axially outwardly from the mouth of the counterbore, said nut compressing said spring means and abutting the bottom of the holder when the pin member is tightened in the nut.

3,996,652

PIPE POSITIONING TOOL

Eugene B. Swinford, 217 Southridge Road, Delray Beach, Fla. 33444

Filed Jan. 14, 1976, Ser. No. 649,136
Int. Cl.² B23P *19/04*
U.S. Cl. 29—265 **7 Claims**



1. A tool for positioning the end of a pipe tightly against a wall at an opening in the wall, said tool comprising:

an elongated rod for insertion through the opening in the wall longitudinally into the pipe;

means on said rod selectively operable to expand radially outward into gripping engagement with the inside of the pipe;

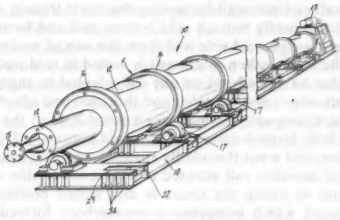
and means operatively associated with the rod to pull the rod and the pipe axially toward the wall, said last-mentioned means including wedge means for engaging the end of the pipe at said opening in the wall to spread said end of the pipe into tight engagement with the wall thereat.

3,996,653

METHOD OF RECONDITIONING UNDER-ROLLER TYPE WIRE STRANDERS

Charles George Faris, and John Gilbert Wynne, both of Sedalia, Mo., assignors to Swiss Aluminium Limited, Chippis, Switzerland

Filed July 10, 1975, Ser. No. 594,622
Int. Cl.² B23P *7/00*
U.S. Cl. 29—401 B **9 Claims**



1. A method of reconditioning an under-roller type strander which comprises a tubular bobbin assembly rotatably mounted to communicate along radially protruding load bearing surfaces with a plurality of support rollers, said support rollers maintained in fixed position on a horizontally extended planar base, said method comprising:

machining said load bearing surfaces to within 0.001 inch tolerance of roundness to maintain said surfaces in smooth parallel relationship to the longitudinal axis of rotation of said bobbin assembly and to reduce the circumference of said surfaces;

detaching said support rollers from said base and providing said support rollers with an increased circumference and machining said rollers to within 0.001 inch tolerance of roundness;

modifying the housing of said rollers and the points of attachment of said housing to said base located along said base, to enable said housing to slidably engage said base for ease in the adjustment and removal of said rollers during the maintenance of said strander by providing the base with a plurality of troughs which extend laterally perpendicular to the direction of the strander axis;

slidably positioning the housing of said rollers and support rollers within the trough;

adjusting said rollers within the trough whereby said rollers are leveled to within 0.002 inch per foot of the intended horizontally extending centerline of said assembly.

3,996,654

METHOD OF MAKING SYNTATIC MODULES

Arne I. Johnson, Springfield, Mass., assignor to Albany International Corporation, Albany, N.Y.

Division of Ser. No. 516,165, Oct. 21, 1974, abandoned. This application Aug. 5, 1975, Ser. No. 601,983
Int. Cl.² B23P *3/00, 25/00*
U.S. Cl. 29—458 **1 Claim**

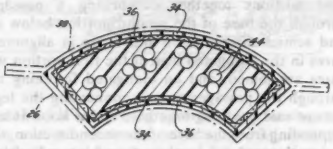
1. The method of providing a pipe member with syntatic modules as flotation devices comprising the steps of:

a. forming a hollow mold having surfaces defining a cavity including an arcuately convex surface for forming one of said modules with an arcuately concave surface thereof;

b. applying a layer of spacer material containing a plurality of voids to the surfaces of said mold;

c. filling said mold with a plurality of hollow balls;

d. adding a syntatic foam resin into said mold interior so as to fill all spaces between said balls and all voids in said spacer material;



e. curing said syntatic foam resin and removing said mold parts whereby to produce said module;

f. applying a tough outer skin to said module;

g. repeating steps b thru f to produce additional like modules; and

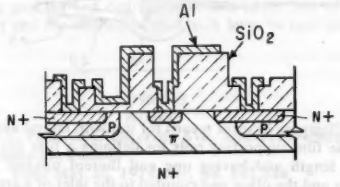
h. assembling said modules as segments around said pipe with the concave surfaces of said modules adjacent said pipe.

3,996,655

PROCESSES OF FORMING INSULATED GATE FIELD EFFECT TRANSISTORS WITH CHANNEL LENGTHS OF ONE MICRON IN INTEGRATED CIRCUITS WITH COMPONENT ISOLATED AND PRODUCT

James A. Cunningham, Santa Clara, Calif.; James E. Schroeder, Houston, Tex., and Mark Roman Guidry, Escondido, Calif., assignors to Texas Instruments Incorporated, Dallas, Tex.

Continuation of Ser. No. 424,997, Dec. 14, 1973, abandoned. This application Aug. 25, 1975, Ser. No. 607,526
Int. Cl.² B01J *17/00*
U.S. Cl. 29—571 **4 Claims**



1. A method of forming MOS transistors for integrated circuits which comprises the steps of:

a. forming a closed first region of predetermined conductivity type in a major face of a substantially intrinsic substrate, said first region surrounding a central area where the material of said substrate is exposed at said major face,

b. forming in said major surface second and third regions of conductivity type opposite to said first region, the second region being within said first region and said third region being in said central area and spaced apart from said second region, the second and the third regions providing the source and drain regions of an MOS transistor

c. forming an insulating layer over an area of at least said first and second regions to provide a gate insulator for an MOS transistor, the semiconductor material beneath the insulating layer providing the channel of an MOS transistor and

d. forming conductive contacts to said second and third

regions to provide source and drain connections in MOS transistor and on said insulating layer to provide a gate connection to an MOS transistor.

3,996,656

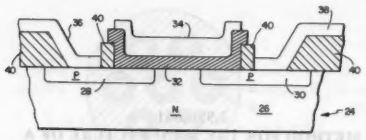
NORMALLY OFF SCHOTTKY BARRIER FIELD EFFECT TRANSISTOR AND METHOD OF FABRICATION

Koy B. Cook, Jr., Cupertino, Calif., assignor to Harris Corporation, Cleveland, Ohio

Division of Ser. No. 501,204, Aug. 28, 1974, Pat. No. 3,946,415. This application Dec. 24, 1975, Ser. No. 643,979

Int. Cl.² B01J *17/00*

U.S. Cl. 29—571 **7 Claims**



1. A method of fabricating a Schottky barrier transistor comprising the steps of:
- doping a surface of a substrate with impurities of conductivity types opposite the conductivity type of said substrate to form two spaced regions;
- forming an insulating layer over said substrate;
- opening apertures in said insulating layer to expose a first portion of each of said spaced regions;
- depositing a first conductive layer on said insulating layer and through said apertures;
- removing said insulating layer over a section of said substrate between said spaced regions;
- forming a layer of substantially undoped semiconductor material over said section; and
- depositing a gate electrode on said substantially undoped semiconductor material.

3,996,657

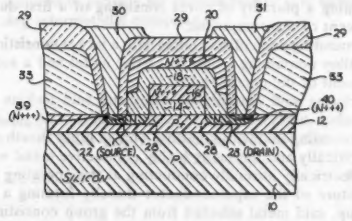
DOUBLE POLYCRYSTALLINE SILICON GATE MEMORY DEVICE

Richard T. Simko, and Phillip J. Salsbury, both of Sunnyvale, Calif., assignors to Intel Corporation, Santa Clara, Calif.

Division of Ser. No. 537,265, Dec. 30, 1974, Pat. No. 3,984,822. This application Jan. 13, 1976, Ser. No. 648,828

Int. Cl.² B01J *17/00*

U.S. Cl. 29—571 **9 Claims**



1. A method for fabricating a double polycrystalline silicon memory device on a substrate comprising the steps of:
- forming a first insulative layer on said substrate;
- forming a first polycrystalline silicon gate over said first insulative layer;
- defining first source and drain regions on said substrate adjacent to said first insulative oxide and said first gate;
- doping said first source and drain regions;
- forming a second insulative layer over said first gate;
- forming a second polycrystalline silicon gate over said second insulative layer;
- defining second source and drain regions within said first source and drain regions;
- doping said second source and drain regions;
- whereby a memory device is formed on said substrate.

3,996,658

PROCESS FOR PRODUCING SEMICONDUCTOR MEMORY DEVICE

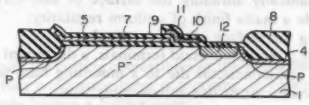
Akira Takei, Yokohama; Yoshihiko Hika, Tokyo, and Ryoiku Togei, Kawasaki, all of Japan, assignors to Fujitsu Ltd., Kanagawa, Japan

Filed Mar. 30, 1976, Ser. No. 671,956

Claims priority, application Japan, Mar. 31, 1975, 50-38809

Int. Cl.² B01J *17/00*

U.S. Cl. 29—571 **16 Claims**



1. A process for producing a semiconductor memory device, which comprises

a semiconductor material substrate of one particular conductivity type and having on the surface thereof a diffused layer of the opposite conductivity type defining a diode region, a surface region of the substrate adjoining the diffused layer defining a first gate region, and another surface region adjoining said one surface region defining a memory cell region,

a first insulating layer on said substrate over said memory cell region and carrying an electrode for said memory cell,

a second insulating layer on said substrate over said first gate region being in contact with said first insulating layer and carrying an electrode for said gate region, wherein

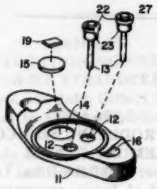
said process comprising steps of:
- forming said first insulating layer over at least said memory cell region of the substrate;
- forming a layer of material to be used for said memory cell electrode, said layer being selectively placed on a part of said first insulating layer so as to mask said first insulating layer over said memory cell region;
- removing the exposed, other part of said first insulating layer so as to expose an unmasked part of the substrate;
- forming said second insulating layer over the top surface of both said exposed unmasked part of the substrate and said layer of material to be used for the memory cell electrode;
- forming a layer to be used for said electrode for said first gate region, said layer being selectively placed over said second insulating layer in a manner such that said layer for said first gate electrode is located above both said first gate region and at least above a part of said memory cell region adjoining gate region;
- selectively removing said second insulating region so as to expose a part of said substrate, and;
- introducing an impurity of said opposite conductivity type so as to form said diffused layer, which forms one member of said diode region.

3,996,659

BONDING METHOD FOR SEMICONDUCTOR DEVICE MANUFACTURE

Stanley Gaicki, Tempe, and Albert Louis Summers, Phoenix, both of Ariz., assignors to Motorola, Inc., Chicago, Ill.

Filed Feb. 10, 1976, Ser. No. 656,910
Int. Cl.² B01J 17/00
U.S. Cl. 29—590 5 Claims



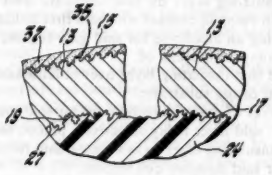
1. A method for manufacturing a semiconductor device characterized by the steps of:
a. joining a terminal with a glass preform in an eyelet in a sealing furnace to form a glass sealed feed-through terminal;
b. etching said terminal to remove surface contamination;
c. mechanically abrading the surface of said terminal to provide a matte finish of uniform regularity;
d. plating the surface of said terminal;
e. joining a plurality of said terminals, a die mount pedestal and a semiconductor die to a mounting base to form a semiconductor device subassembly; and
f. forming an electrical innerconnection by ultrasonically bonding a conductor to said semiconductor die and to said terminal.

3,996,660

LOW VOLTAGE ALUMINUM COMMUTATORS

James L. Hancock, Fairborn, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Division of Ser. No. 535,348, Dec. 23, 1974. This application Feb. 9, 1976, Ser. No. 656,119
Int. Cl.² H01R 43/06
U.S. Cl. 29—597 3 Claims



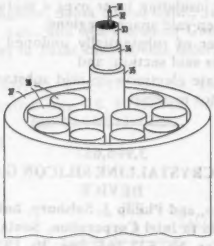
1. A method of forming a commutator for use in motors and generators wherein the applied or produced voltage may range from about 3 to about 30 volts, said commutator comprising a resinous spool and uniformly spaced around the periphery of said spool, a plurality of conductive aluminum alloy bars, said aluminum alloy containing from about 0.1 to about 1% iron and having the ability to form a tenacious oxide layer on the surface thereof, said method comprising the steps of:
a. preferentially electrolytically etching clean aluminum alloy bar pieces and thereby forming many small cavities in the surfaces thereof, and
b. electrolytically forming a tenacious and conductive oxide layer having a thickness in the range of from 500 to 1,500 angstroms on the surfaces of said bar pieces;
c. loading the outer surfaces of said bar pieces with a soft conductive material; and
d. molding said commutator by forming said resinous spool under high temperature and pressure against said bar pieces, so that said resin enters said cavities, thereby forming a strong interlocking mechanical bond between said spool and said bars.

3,996,661

METHOD FOR THE MANUFACTURE OF A SUPERCONDUCTOR HAVING AN INTERMETALLIC TWO ELEMENT COMPOUND

Gunther Ziegler, Erlangen, and Peter Lanig, Erlangen-Bruck, both of Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany

Filed June 13, 1974, Ser. No. 478,963
Claims priority, application Germany, June 22, 1973, 2331962
Int. Cl.² H01V 11/00
U.S. Cl. 29—599 10 Claims



1. A method for the manufacture of a multicore superconductor having a superconductive intermetallic compound made up of two elements and having an A-15 crystal structure comprising the steps of:
a. forming a plurality of cores consisting of a first ductile element of the compound;
b. surrounding each of said cores with a jacket consisting of an alloy containing a ductile carrier metal and a second element of the compound;
c. enclosing said plurality of cores and said jackets in a tantalum tube;
d. surrounding said tantalum tube with an inner sheath of an electrically and thermally highly conductive metal which is electrically normally conducting at the operating temperature of the superconductor thereby forming a subgroup, said metal selected from the group consisting of copper, aluminum and silver;
e. enclosing a plurality of said subgroups with a common outer sheath of electrically and thermally highly conductive metal which is electrically normally conducting at the operating temperature of the superconductor, said metal selected group consisting of copper, aluminum and silver;
f. subjecting the structure so obtained to a crosssection reducing deformation; and
g. heat treating the structure of reduced cross-section to form said intermetallic compound.

3,996,662
METHOD FOR THE MANUFACTURE OF A SUPERCONDUCTOR HAVING AN INTERMETALLIC TWO ELEMENT COMPOUND

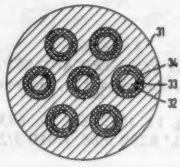
Dietrich Hauck, Rodenbach, Stockheim, and Manfred Wilhelm, Nurnberg, both of Germany, assignors to Siemens Aktiengesellschaft, Munich and Vacuumschmelze GmbH, Hanau, both of, Germany

Filed June 20, 1974, Ser. No. 481,259

Claims priority, application Germany, June 22, 1973, 2331919

Int. Cl.² H01V *11/00*

U.S. Cl. 29—599 **17 Claims**



1. A method for the manufacture of a superconductor having a superconducting intermetallic compound of at least two elements comprising the steps of:
   a. forming a core of metal selected from the group consisting of copper, silver, aluminum and alloys consisting of at least two of these metals;
   b. surrounding said core with a single closed jacket containing a ductile first component of the intermetallic compound to be formed selected from the group consisting of niobium and vanadium so that said core is in physical and electrical contact with said jacket;
   c. surrounding said jacket with a single closed sheath consisting of an alloy containing a ductile carrier metal and a second component of the intermetallic compound to be formed so that said jacket is in physical and electrical contact with said sheath;
   d. subjecting the composite structure made up of said core, said jacket and said sheath to a cross section reducing deformation; and
   e. after cross section reducing, subjecting the composite wire so formed to a heat treatment whereby said second component in said sheath will diffuse into said jacket and react with said first component to form a layer of said superconducting intermetallic compound in the area of said jacket adjacent to said sheath, with said core of metal remaining an electrically and thermally high conductive material to provide for stabilization of said superconducting intermetallic compound.

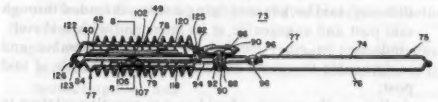
3,996,663
HAIR CUTTERS

Abram N. Spanel, 344 Stockton St., Princeton, N.J. 08540

Filed July 1, 1974, Ser. No. 484,566

Int. Cl.² B26B *21/12*

U.S. Cl. 30—30 **12 Claims**



1. A hair cutter comprising:
   blade support means for supporting a hair cutting blade in a laterally disposed series of selectable hair cutting positions including bearing structure to longitudinally restrain said blade support means;
   frame-like structure compatible with said bearing structure;
   a cage attached to said frame-like structure;
   guide means by which said blade is longitudinally movable with respect to said blade support means; and
   driving means engaging said blade support means for producing lateral movement with respect to said frame-like structure to the selectable hair cutting positions.

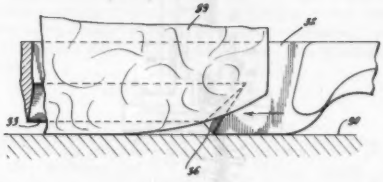
3,996,664
NON-SCRATCHING KNIFE

Herbert P. Lee, Cannon Hill, R.D. 1, Brodbecks, Pa. 17308

Continuation-in-part of Ser. No. 521,056, Nov. 5, 1974, abandoned. This application July 7, 1975, Ser. No. 593,691

Int. Cl.² B26B *9/02, 29/02*

U.S. Cl. 30—286 **5 Claims**



1. A knife for cutting comestibles or the like without injuring a surface supporting them comprising, in combination,
   a. a blade having a cutting edge;
   b. at least one runner portion protruding slightly from the cutting end, at least at the forward end of the blade, and being sufficiently wide and therefore blunt so that it will not scratch or cut substrates, and
   c. each runner being provided on each side with a ramp inclined up toward the adjacent cutting edge, the ramp having an angle sufficiently small to permit comestibles being cut to rise along the ramp and being forced in contact with the cutting edge, whereby all of the comestibles are forced to encounter the cutting edge and no narrow strip of uncut material is left.

3,996,665
HOLDER FOR DETACHABLE BLADES

Douglas B. Malchow, Minneapolis, Minn., assignor to Warner Manufacturing Company, Minneapolis, Minn.

Filed May 8, 1975, Ser. No. 575,786

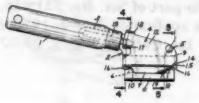
Int. Cl.² B26B *5/00*

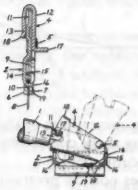
U.S. Cl. 30—331 **1 Claim**

1. A holder for detachable blades, comprising:
   a. an elongated handle;
   b. a base member projecting longitudinally from one end of said handle and formed from sheet metal to provide a lower elongated flat skirt portion for face-to-face engagement with one side surface of a cutting blade, a pair of lugs projecting outwardly of said base member at opposite ends of said skirt portion for locking engagement with a portion of a cutting blade engaged by the skirt portion, a longitudinally extending portion above said skirt portion and said lugs laterally outwardly offset from said skirt portion, and a generally flat upper portion above said offset portion and laterally inwardly offset from said offset portion and parallel to said skirt portion;
   c. a retainer member formed from sheet metal to provide a lower flat skirt portion for face-to-face engagement with the other side surface of a cutting blade in opposition to the base member skirt portion, and an upper portion laterally outwardly offset from its respective skirt portion and parallel thereto;
   d. a pivot shaft disposed on an axis normal to the planes of

said skirt portions pivotally mounting said retainer member on said base member at one end of said members in face-to-face engagement of said upper portions of the base and retainer members and for movements toward and away from a blade retaining position wherein said skirt portions are disposed in face-to-face relationship;

e. said retainer member having an upper edge and being further formed to provide a hook depending from said upper edge at the end of said retainer member opposite said pivot shaft for reception of a portion of said base member when said retainer member is moved to its blade-retaining position, and a laterally outwardly projecting operating lug generally opposite said hook;





f. said offset portions of said base and retainer members cooperating to define an open-ended passageway extending longitudinally of said skirt portions, said retainer member skirt portion having opposite end portions engaging said lugs to limit downward movement of said retainer member relative to said base member, said retainer member skirt portion further having a lower corner portion at an end thereof adjacent said pivot shaft formed to provide a generally triangular guide lip projecting in a direction angularly longitudinally and laterally outwardly and downwardly relative to its respective skirt portion.

3,996,666

DEVICE FOR CONTINUOUS AUSCULTATION OF THE MOTION AND POSITIONS OF A PATIENT MANDIBLE

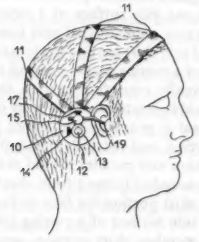
Pierre Blanque, 5, Ave. des Montagnes, 64200 Biarritz, France

Filed Dec. 17, 1974, Ser. No. 533,538

Claims priority, application France, Dec. 17, 1973, 73.44976

Int. Cl.² A61C *9/00*

U.S. Cl. 32—19 **14 Claims**



1. A device for permanent auscultation of the mandibular movements of a patient of the type structured to penetrate into the external auditory meatus and to be applied onto the posterior part of the condyle, comprising means for sensing the displacement of the condyle through the external auditory meatus resulting from mandibular movements and providing a signal representative of said displacement, means for detection and amplification of said signal corresponding to said displacement, and means for indicating the variations of said signals and corresponding to the various movements and positions of the condyle.

3,996,667

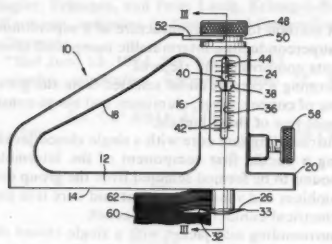
PAPER SHEET COUNTER AND SEPARATOR

George M. Barnard, P.O. Box 126, DeTour Village, Mich. 49725

Filed Aug. 11, 1975, Ser. No. 603,318

Int. Cl.² B25B *9/00*; G01B *3/22*

U.S. Cl. 33—143 R **4 Claims**



1. An adjustable separator for picking groups of preselected numbers of sheets from the top of a supply stack of the sheets comprising:

a base having a straight bottom adapted to lie flush on the top of said stack and having a post extending from the opposite side of the base from its bottom;

said base and said post defining a slideway opening perpendicularly through said bottom of said base, said slideway being a tubular bore;

a slide member slidable in said slideway and projectable below said base, said slide member being a cylindrical rod;

a finger element secured to the bottom of said slide member and having an end portion projecting beyond said slideway in lapped relation to said bottom of said base and tapering in its projecting end to minimum thickness;

adjusting means connected to said slide member and projecting exteriorly of said post to reciprocate said slide member in said slideway and move said finger element relative to said bottom of said base, said adjusting means including a screw element threadedly engaged with said rod and having a head on its upper end restrained against axial movement relative to said post;

releasable lock means carried by said post and engageable with said slide member to lock the slide member in said slideway, said lock means being a screw threaded through said post and engageable at its inner end with said rod;

an indicator member carried by said slide member and reciprocable therewith and visible on the outside of said post;

an indicia on the outside of said post in coacting relation to said indicator member;

means preventing rotation of said slide member in said slideway; and

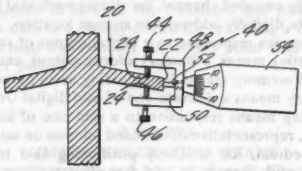
a handle grip connected to said base.

3,996,668

SHROUD WEAR MEASUREMENT

Harold Maynard Sharon, Glastonbury, Conn., assignor to United Technologies Corporation, Hartford, Conn.

Filed Aug. 18, 1975, Ser. No. 605,563
Int. Cl.[2] G01B 5/00
U.S. Cl. 33—170 2 Claims



1. For a fan blade of a turbofan gas turbine engine, a method for measuring wear on the end surface of a mid-span shroud having a pair of side surfaces extending circumferentially from the blade, comprising the steps of:

positioning the internal base surface of a marking tool, having an upper marking pin and a lower marking pin which are slideably mounted in opposing relationship in a U-shaped frame, against the end surface of a mid-span shroud with the U-shaped frame bracketing at least a portion of the side surfaces of the shroud;

disposing the upper marking pin of the marking tool against one of the side surfaces of the shroud at a known distance from the end surface of the shroud;

disposing the lower marking pin of the marking tool against the other side surface of the shroud at a known distance from the end surface of the shroud;

resting the lower marking pin of the U-shaped tool against a surpport member;

striking the upper marking pin so as to cause the upper and lower marking pins to simultaneously set a pair of reference indentations in the side surfaces of the shroud at said known distance from the end surface;

subsequently positioning the internal base surface of a measuring tool, having an upper positioning pin and a lower positioning pin which are mounted in opposing relationship in a U-shaped frame at a known distance from the internal base surface, in opposing spaced relationship to the end surface of the mid-span shroud with the U-shaped frame bracketing at least a portion of the side surfaces of the shroud;

disposing the upper positioning pin against one of the side surfaces of the shroud engaging the reference indentation set therein;

disposing the lower positioning pin against the other side surface of the shroud engaging the reference indentation set therein;

operatively disposing a gaging instrument between the end surface of the shroud and the internal base surface of the measuring tool; and

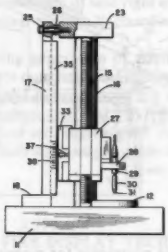
measuring with said gaging instrument the distance between the reference indentations of the side surfaces and the end surface so as to determine the extent to intervening wear on the end surface.

3,996,669

WIDE-RANGE DEVICE FOR MEASURING THE LINEAR SIZES OF MECHANICAL WORKPIECES

Cesare Anichini, Florence, Italy, assignor to Finike Italiana Marposs-Soc. In Accomandita Semplice di Mario Possati & C., Bentivoglio, Italy

Continuation of Ser. No. 419,251, Nov. 27, 1973, abandoned.
This application June 12, 1975, Ser. No. 586,379
Claims priority, application Italy, Dec. 1, 1972, 3606/72
Int. Cl.[2] G01B 7/02
U.S. Cl. 33—172 E 10 Claims



1. A wide-range measuring device for measuring the sizes of mechanical workpieces, comprising:

support means;

mechanical guide means carried by said support means;

slide means movable along said guide means;

measuring head means fixed on said slide means and having distance-measuring transducer means covering a determined measuring range;

driving and positioning means coupled to said slide means and including:

motor means;

transmission means driven by the motor means and coupled to the slide means for displacing the latter in either direction along said guide means;

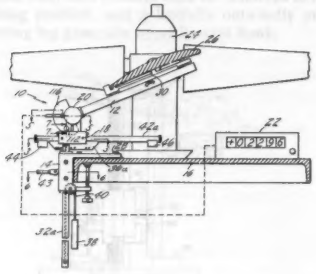
position transducer means covering a measuring range wide in comparison with that of said distance measuring transducer means, and comprising reciprocally moving elements fixed to said support means and slide means, respectively, said position transducer means including means for providing error signals upon deviation of the relative position of said moving elements from a number of determined reference positions thereof; and circuit means connected to said position transducer means and to said motor means to feed to the latter said error signals for driving the motor means to position said reciprocally moving elements in correspondence with said reference positions;

said circuit means including switch means for activating the feeding of said motor means by said error signals when said slide means reaches a position at which the distance measuring transducer means has a predetermined spatial relationship with respect to the workpiece to be measured, when the latter is located in the measuring position with respect to the measuring device; and output means coupled to said measuring head means and said position transducer means for obtaining the size of the workpiece by combination of signals depending on the relative position of said reciprocally moving elements and signals provided by said distance-measuring transducer means.

3,996,670
PROTRACTOR WITH DIGITAL READOUT

George J. Joyal, Chicopee, Mass., and George H. Gakeler, Vernon, Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed Aug. 19, 1974, Ser. No. 498,820
Disclosure was also published under second Trial Voluntary Protest Program on Mar. 9, 1976
Int. Cl.² G01B *3/30, 5/24*
U.S. Cl. 33—174 S 5 Claims

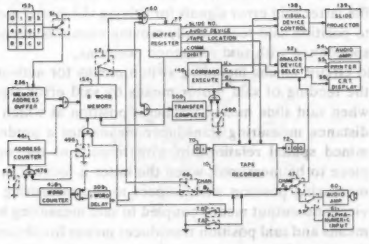


1. A propeller protractor for measuring the blade angle of the blades thereof including a clamp removably fixed to a table supporting the propeller whose blades are intended to be measured and located at a fixed relationship to the station of that blade, a first pair of spaced rod like elements extending vertically relative to the top surface of said table slidably supported in said clamp, a second pair of spaced rod-like elements extending horizontally relative to said top surface attached to said first pair of spaced rod like elements, and movable vertically but remaining in a predetermined parallel relationship to said top surface, a carriage slidably mounted on said second pair of spaced rod like elements, a sine bar pivotally connected at one end to said carriage adapted to be angularly moved to abut against a surface of the blade to be measured, a shaft angle encoder secured to said carriage and connected to the pivoted end of said sine bar to be rotated thereby, a digital readout electrically connected to said shaft angle encoder being programmed to give a digital representation of the angle relationship of said sine bar and a viewer on said readout recording said readout value.

3,996,671
INSTRUCTION MACHINE

Richard W. Foster, 7600 Saxon Drive, Huntsville, Ala. 35802

Filed Mar. 19, 1974, Ser. No. 452,524
Int. Cl.² G09B *7/08*
U.S. Cl. 35—8 A 12 Claims

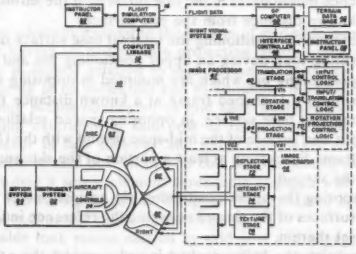


11. An instruction machine comprising:
a recording medium having at least one track, said track having at least one digitally encoded channel having recorded thereon at, at least at one recording location a plurality of digitally encoded words, each word representative of separate discrete locations on said recording medium;
recording medium transport means for accommodating and for selectively moving said recording medium;
transducer means positionable adjacent to said recording medium for playing back from said recording medium;
digital generating means, including a keyboard for selecting and generating a digital output;
memory means responsive to said transducer means and a selected plurality of digital words sensed by said transducer means from at least one, a first, address on said digitally encoded channel, for storing each said word in a discrete digitally addressable storage location;
control means responsive to a digital output of said digital generating means, a memory address output, and coupled to said memory means for providing as an output of said memory means a discrete one of said digital words;
positioning means responsive to a said one of said digital words, representative of a second address on said recording medium, for relatively positioning said transducer means with respect to said recording medium adjacent said second address for enabling said transducer means to engage and reproduce a thus selected portion of a said track; and
readout means coupled to said transducer means for reproducing information from a recording responsive to signals recorded on said recording medium;
whereby one of said selected plurality of words located at a first address on said recording medium and representative of a second and remote address on said recording medium is selected by a particular operation of said keyboard enabling the machine to locate and play back material as a function of a student's response entered on said keyboard.

3,996,672
REAL-TIME SIMULATION OF A POINT SYSTEM AS VIEWED BY A MOVING OBSERVER

Raymond C. Osofsky, Santa Clara; David Raymond Marsh, Los Altos, and Wei L. Chen, Cupertino, all of Calif., assignors to The Singer Company, Binghamton, N.Y.

Filed Mar. 12, 1975, Ser. No. 557,710
Int. Cl.² G06F *15/20*
U.S. Cl. 35—10.2 37 Claims



1. A data processor responsive to observer position and orientation data from a simulation computer, and to object point data to simulate the visual relationship between an observer coordinate system and an object coordinate system in relative motion;
object data source means for providing object point digital data;
computer means for receiving object point data and

adapted to receive at least the observer position data from the simulation computer and responsive to the received data for providing initialization data by translating selected initial object points from the object data source into the observer coordinate system, and for holding at least the object point data and the initialization data in a predetermined image digital data format having dedicated code bits for identifying classes of data; and

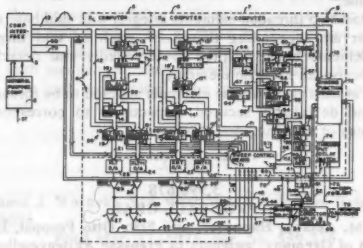
a hard-wired image digital circuit responsive to the code bits of the image data format to receive the object point data and the initialization data for translating the object point data into the observer coordinate system, and responsive to the observer orientation data for rotating the object point data into the observer coordinate system, and which is adapted to forward the translated and rotated object point data to a display device for providing a visual scene of at least a portion of the object point data in the observer perspective.

3,996,673

IMAGE GENERATING MEANS

Carl J. Vorst, Overland, and John Mackey, St. Charles, both of Mo., assignors to McDonnell Douglas Corporation, St. Louis, Mo.

Filed May 29, 1975, Ser. No. 581,835
Int. Cl.² G09B 9/08; H04N 7/00
U.S. Cl. 35—10.2 **23 Claims**



1. An apparatus for generating an image, comprising:

a display means, said display means having a desired image visual output, said output being constructed electrically by applying selected control data to said display means for controlling a beam;

means for generating a beam operatively connected to said display means, said beam being movable to construct the image desired for display;

means for generating left edge vector data corresponding to an edge of the image desired for display, said left edge vector generating means having an output side;

means for generating right edge vector data corresponding to a right edge of a desired image, said right edge vector data generating means having an output side;

means for comparing the instantaneous X coordinate position of the beam with said left edge vector data, said left edge comparing means being operatively connected between said beam generating means and the output side of said left edge vector data generating means;

means for comparing the instantaneous X coordinate position of the beam with said right edge vector data, said right edge comparing means being operatively connected between said beam generating means and the output side of said right edge vector data generating means;

sweep control means responsive to a comparison in said left edge comparing means and said right edge comparing means for generating an unblanking signal if said beam is entering the image defined by said left and said right edge vector data, and for incrementing the Y position of said beam, removing said unblanking signal, and reversing the direction of the sweep of said beam if said beam is leaving the image defined by said left and said right edge vector data, said sweep control means being operatively connected to said right and said left edge comparing means and to said beam generating means;

means for monitoring the Y coordinate position of said beam operatively connected to said sweep control means;

means for comparing the Y coordinate position of said beam with the Y coordinate of said left edge vector data operatively connected to said Y coordinate monitoring means;

means for comparing the Y coordinate position of said beam with the Y coordinate of said right edge vector data operatively connected to said Y coordinate monitoring means; and

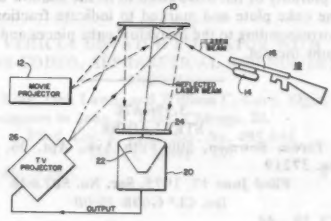
means for commanding generation of additional left edge and right edge vector data, said commanding means being operatively connected between said left edge Y coordinate comparing means and said left edge vector data generating means and said right edge Y coordinate comparing means and said right edge vector data generating means.

3,996,674

DISTRIBUTION OF FIRE DISPLAY TECHNIQUE FOR MOVING TARGET SCREENS

Herman I. Pardes, Wanamassa, and Joseph R. Schwartz, Toms River, both of N.J., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Jan. 29, 1976, Ser. No. 653,312
Int. Cl.² F41G 3/26
U.S. Cl. 35—25 **6 Claims**



1. A system for showing the distribution of gun weapon fire on a screen upon which are projected moving targets and wherein a pulse laser beam is directed at respective moving targets when said weapon is fired, said system comprising:

a TV camera having its pick-up lens focused on said target screen;

means in front of said pick-up lens for permitting only reflected laser beam pulses to pass to said TV camera to produce respective spots corresponding to respective laser pulses; and

means responsive to the output of said TV camera for optically projecting said spots on said screen whereby the respective spots provide a visual indication of a hit or miss of a selected target on said screen.

3,996,675

INSTRUCTIONAL BIRTHDAY CAKE TOY

Ruth M. Placek, 1121 Hollybluff, Austin, Tex. 78753

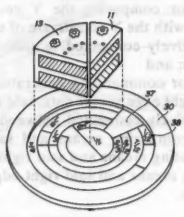
Filed Aug. 14, 1975, Ser. No. 604,830
Int. Cl.² G09B 23/02; A63H 33/42
U.S. Cl. 35—31 D **4 Claims**

1. A combination imitation cake and dish set educational toy comprising:

a. a cylindrical multipiece imitation cake with mounting receptacles for letters and candles and formed by a plurality of pie-shaped fractional slices defining different included angles;

b. a plurality of artificial candles of such size and shape that they may be easily but snugly mounted in candle receiving and mounting recesses;

c. a plurality of attachable, removable letter-shaped symbols provided with mounting studs matching the mounting receptacles provided on the upper surface of the cake and with sufficient letter symbols to spell a plurality of words;



d. an attachable, removable garter-like elastic strap fabricated to simulate a cake decoration ring when installed around the assembled cake cylinder that actually functions to hold the assembled parts of the artificial birthday cake together;

e. a cake plate having a circular plate lip extending around the upper and outer edge defining a shallow circular cylinder having a bottom surface sized to snugly hold the imitation cake; and

f. a plurality of flat disks sized to fit the shallow cylinder of the cake plate and marked to indicate fractional pieces corresponding to the individual cake pieces and combinations thereof.

3,996,676

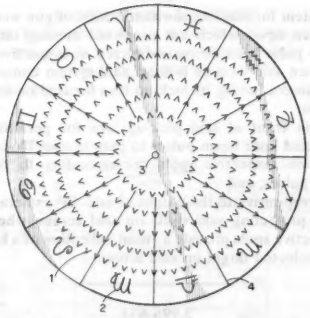
STELLADISK

Mary Teresa Bowmen, 500 Fifth Ave., Apt. 36, Nashville, Tenn. 37219

Filed June 17, 1975, Ser. No. 587,646

Int. Cl.² G09B 29/00

U.S. Cl. 35—44 4 Claims



1. A device for erecting horoscopes comprising a circular base disk provided on its upper surface with radii dividing said disk into twelve segments, zodiac house sign indicia disposed in and identifying each segment, and v-shaped slots disposed in circular arrays about the center of said disk, certain of said slots being disposed interiorly of said segments and certain of said slots being disposed along said radii; and a plurality of planetary disks each provided with planet indicia on their upper surfaces and v-shaped shanks extending from their lower surfaces, said shanks being sized to fit within said slots.

3,996,677

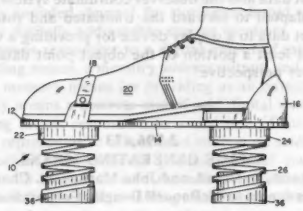
EXERCISE SKATE

Joseph Reina, Copiague, N.Y., assignor to Lawrence Peska Associates, Inc., New York, N.Y., a part interest

Filed June 11, 1976, Ser. No. 695,252

Int. Cl.² A43B 3/10

U.S. Cl. 36—7.8 7 Claims



1. An exercise skate comprising in combination:

a support frame including a base member having means thereon for detachably securing the support frame to a shoe;

at least two threaded elements integral with said base member and depending therefrom, each of said threaded elements being adapted to threadedly and detachably receive an exercise element;

and at least two exercise elements adapted to be threadedly and detachably secured respectively to corresponding ones of said threaded elements.

3,996,678

FREE-FALL GRAB

Hans M. Amann, Hannover, and Fritz Otto Poeppel, Luthe, both of Germany, assignors to Preussag Aktiengesellschaft, Germany

Filed Sept. 11, 1975, Ser. No. 612,234

Claims priority, application Germany, Sept. 16, 1974, 2444167

Int. Cl.² B66C 3/02

U.S. Cl. 37—183 R 10 Claims

1. An improved free-fall grab for picking up ground samples from a sea bed located beneath the surface of the sea, the improved free-fall grab comprising:

a buoyancy member;

a scissors-type grab mechanism positioned beneath the buoyancy member and including first and second lower arms that constitute grab halves and first and second upper arms that are connected and move with the first and second lower arms, respectively, and that have abut-

ment surfaces formed thereon, the first and second arms being pivotably movable relative to one another between a grab half opened position and a grab half closed position;

cable means connecting the scissors-type grab mechanism with the buoyancy member;

at least one weight adapted to be carried by the scissors-type grab mechanism during the descent of the grab to the sea bed;

detachable means attaching the weight to the scissors-type grab mechanism while the arms of the scissors-type grab mechanism are in their opened position and for permitting the weight to fall away from the scissors-type grab mechanism as the arms of the scissors-type grab mechanism move from their opened position to their closed position;

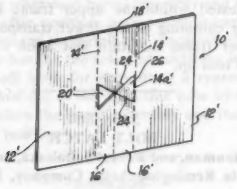
a bar having abutment surfaces formed thereon and being carried by the buoyancy member beneath the buoyancy member and between the buoyancy member and the scissors-type grab mechanism, the abutment surfaces on the bar being adapted to contact the abutment surfaces on the upper arm of the scissors-type grab mechanism when the arms are in their opened position and to remain in contact with the abutment surfaces on the upper arms so as to maintain the arms in their opened position while the free-fall grab is descending toward the sea bed, with the abutment surfaces of the bar being movably out of contact with the abutment surfaces on the upper arms when the lower arms of the scissors-type grab mechanism come to rest on the sea bed so that the buoyancy force of the buoyancy member will cause the arms of the scissors-type grab mechanism to move to their closed position, thereby causing the weight to fall off of the scissors-type grab mechanism, and thereafter will cause the scissors-type grab mechanism to be raised to the surface of the sea.

3,996,679

BADGE

Richard J. Warneke, 915 West Miner, Arlington Heights, Ill. 60006

Filed Mar. 17, 1975, Ser. No. 559,326
Int. Cl.² A44C *3/00*
U.S. Cl. 40—1.5 **1 Claim**



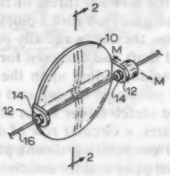
1. A device for temporary attachment to an article of clothing, comprising a body portion formed of a pair of panels adapted to carry indicia on the outer surface thereof, a rectangular support portion formed of a pair of opposed panels, the panels of the support portion being joined to one another along one of their major margins and each of these support panels being joined to a different one of the panels of the body portion along another of their major margins, one of the support panels having tab means adapted to maintain the panels of the support portion in superposed relation, and fabric engaging means provided in the panels of the support portion and extending inwardly from said one of their margins, the fabric engaging means providing opposed, slightly spaced and diverging fabric engaging surfaces for receiving a fold of fabric therebetween, said tab means in cooperation with the fold of fabric serving to maintain said support panels in superposed relation whereby the device is displayed on an article of clothing to which it is temporarily attached.

3,996,680

DISPLAY ELEMENT

Charles Norman Smith, Ontario, Canada, assignor to Ferranti-Packard Limited, Toronto, Canada

Filed Aug. 18, 1975, Ser. No. 605,303
Int. Cl.² G09F *11/00*
U.S. Cl. 40—28 C **5 Claims**



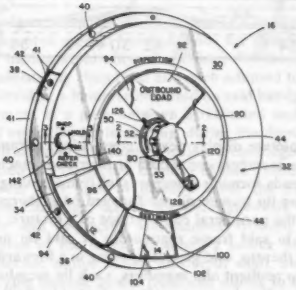
1. A disc of substantially non-magnetic material, provided on opposite sides with ears extending transversely in the same direction relative to the disc, said ears being designed to allow the pivotal mounting of said disc on supporting means, said disc being contrastingly colored on opposite surfaces said disc being shaped so that two spaced concavities are provided as viewed on one of said surfaces, said concavities being on opposite sides of and defining on the surface on which they appear a ridge extending across said disc approximately parallel to the pivotal axis of the disc, said concavities and ridge appearing on the opposite surface as convexities and a valley.

3,996,681

VEHICLE DISPATCH INDICATOR WITH COLOR-CODED, ALPHABETICAL AND NUMERICAL INDICIA

John H. King, Oak Lawn, and William C. Gore, Elgin, both of Ill., assignors to John H. King, Chicago, Ill.

Filed Aug. 8, 1974, Ser. No. 495,646
Int. Cl.² G09F *7/00*
U.S. Cl. 40—129 C **6 Claims**



1. A dispatch indicator designed for application to a vehicle or other merchandise-enclosing container and adapted to render shipping instructions, said indicator comprising a housing having a rear wall, a front wall and an interconnecting continuous side wall, said front wall being provided with a central hub, a shaft mounted in said hub for rotation and also limited axial sliding movement endwise therethrough, said front wall being provided with a first viewing opening in the peripheral region thereof and with a second viewing opening in the medial portion thereof at a region displaced radially

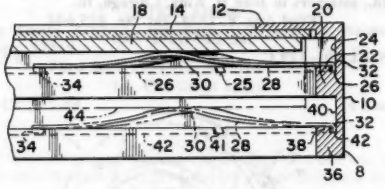
inwardly of the first viewing opening, a relatively large diameter circular rear dial plate coaxial with said shaft and through which the latter loosely projects, a relatively small diameter circular front dial plate coaxial with said shaft and through which the latter loosely projects, said large diameter dial presenting indicia sectors which are visible through said first viewing opening, said small diameter dial presenting indicia sectors which are visible through said second viewing opening, spring means interposed between said dial plates yieldingly biasing the same apart, a fixed front reaction plate carried by said front wall for assimilating the rearward thrust of said front dial plate, a fixed rear reation plate carried by said rear wall for assimilating the forward thrust of the rear dial plate each reaction plate being formed with a plurality of radially extending clutch recesses therein, a radially projecting clutch finger mounted on said shaft and designed for selective cooperation with said recesses depending upon the axial position of said shaft, means for yieldingly biasing said shaft to a medial position wherein said clutch finger is out of effective engagement with said dial plates, a circular row of detent depressions and a series of fixed cooperating detent protuberances effective between each dial plate and its associated fixed reaction plate to restrain rotational movement of such plate when an indicia sector thereon is in register with its associated viewing opening, and a control knob mounted on the forward end of said shaft exteriorly of the housing.

3,996,682

SELF CONTAINED FRAME

Richard Schwartz, N. Bellmore, N.Y., assignor to North American Enclosures, Inc., Bay Shore, N.Y.

Filed Nov. 12, 1975, Ser. No. 631,268
Int. Cl.² G09F 1/12
U.S. Cl. 40—156 12 Claims



1. A picture display device comprising: a frame defined by four side members connected at their ends, each pair of connected ends forming a corner, said frame having an inwardly extending lip formed on the forward edge thereof adapted to engage the peripheral edge surface of a picture; a first groove formed in said frame rearwardly of said lip and extending parellel thereto, said groove opening in a forward direction; at least two resilient clip members, each lip member including a central portion having a surface adapted to resiliently abut the rear of said picture to urge it into engagement with said lip and a pair of end portions, each clip member extending angularly across a respective frame corner with said end portions extending resiliently into and being captured within said forwardly opening groove so that lateral movement of said clip end portions out of said groove is normally prevented, each of said clip members comprising a generally V-shaped body member, having an apex portion including said surface adapted to abut the rear of said picutre, said clip body member being tapered at each end and said clip end portions including a tongue extending from said tapered end.

3,996,683

FRAME FOR A TRANSPARENCY

Rudolf Hanke, Monheim, Schwaben, Germany, assignor to Hama Hamaphot KG., Hanke & Thomas, Monheim, Schwaben, Germany

Filed Oct. 30, 1975, Ser. No. 627,241
Claims priority, application Germany, Apr. 15, 1975, 2516493
Int. Cl.² C09F 1/12
U.S. Cl. 40—158 B 1 Claim

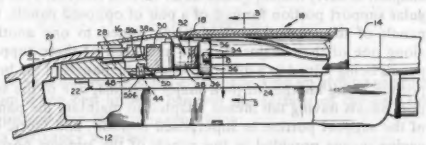
1. A transparency frame and cooperant fitting tool for fitting a transparency to the frame comprising in combination:
- a one-piece frame having a central window defining an image plane and opposite upper and lower transparency insertion slots in coincidence with the image plane and emanating from opposite longitudinal edges of the window,
- the window length forwardly of the image plane being greater than the transparency length for allowing a sliding-fit play between window and transparency,
- the window length rearwardly of the image plane being smaller than the transparency length,
- the opposite frame insertion slots having bottoms separated by at least the transparency width, and
- a fitting tool including a recess extending inwardly from one side thereof and communicating with a frame-receiving through-slot,
- the recess of the fitting tool defining an open mouth having an inclined lip leading inwardly and downwardly to the through-slot,
- all adapted and arranged for pushing the frame through the fitting tool through-slot with the upper transparency edge being nested within the upper frame insertion slot in effecting camming of the lower transparency edge into the lower frame insertion slot upon contact with the inclined tool lip.

3,996,684

BOLT LATCH

Thomas G. Bauman, and Robert J. Balaska, both of Ilion, N.Y., assignors to Remington Arms Company, Inc., Bridgeport, Conn.

Filed Dec. 18, 1975, Ser. No. 641,962
Int. Cl.² F41C 11/06
U.S. Cl. 42—16 10 Claims



1. In a break-open firearm having a barrel assembly hinged to a frame to permit pivotal movement of the barrel assembly and frame from a closed position to a break-open position, an action bar assembly reciprocally mounted in said frame to

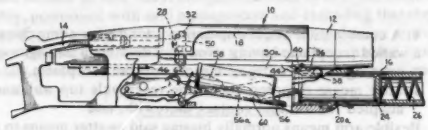
move from a rear, breech-open position to a forward, breech-closed position, bolt carrier means rigidly mounted on said action bar assembly, bolt means slidably and rotatably mounted in said bolt carrier means, cam means responsive to relative linear movement of said bolt means and said bolt carrier means for rotating said bolt means into locking and unlocking engagement with said barrel assembly, a bolt latch for selectively preventing linear movement of said bolt means relative to said bolt carrier means, means pivotally mounting said bolt latch for movement to bolt-blocking position transversely to the linear direction of movement of said action bar assembly, means for disengaging said bolt latch to permit such relative linear movement of the bolt means and the bolt carrier means when the action bar assembly is in the forward, breech-closed position, said action bar assembly, bolt carrier, bolt means, and bolt latch being self-contained so as to be removable as a unit from said frame when disassembled.

3,996,685

SHELL CUT-OFF LATCH

Thomas G. Bauman, and Robert J. Balaska, both of Ilion, N.Y., assignors to Remington Arms Company, Inc., Bridgeport, Conn.

Filed Nov. 14, 1975, Ser. No. 632,143
Int. Cl.² F41C *11/00*
U.S. Cl. 42—17 **8 Claims**



1. A break-open firearm in which a barrel assembly is hinged to a frame so that when unlatched, the barrel assembly and frame can pivot relative to each other from a closed position to a break-open positon, said barrel assembly comprising an elongated barrel having a chamber therein, a magazine tube, open-ended at its rear end, extending adjacent to and parallel to said barrel for receiving a plurality of cartridges placed end-to-end, means biasing said cartridges rearwardly toward said open end of the magazine tube, stop means on said frame engaging said rearmost cartridge to prevent release of said cartridge when said barrel assembly and frame are in a closed, ready-to-fire position, action side means operable to cam said stop means to permit the rearmost cartridge to be released, means feeding the released cartridge into the chamber, and a cut-off latch for preventing a rearmost cartridge from being pushed out of the magazine tube by said cartridge biasing means when the barrel assembly and the frame are in the break-open position.

3,996,686

GEAR-DRIVEN DOUBLE-ACTION FIRING MECHANISM FOR FIREARMS

Richard L. Baker, Wallingford, Conn., assignor to The Leisure Group, Inc., Los Angeles, Calif.

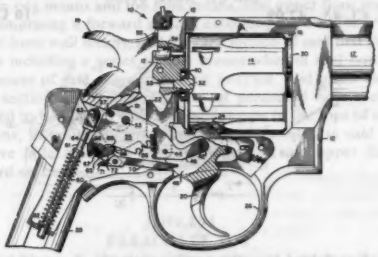
Continuation-in-part of Ser. No. 526,719, Nov. 25, 1974. This application Mar. 24, 1975, Ser. No. 561,249
Int. Cl.² F41C *19/00*
U.S. Cl. 42—65 **6 Claims**

1. In a firing mechanism for a firearm having a frame, a hammer member mounted on a hammer pin in said frame for pivotal movement between cocked and fired positions, and a hammer spring urging said hammer member into its fired position and a trigger mounted on said frame for cocking and releasing said hammer member, the improvement comprising in combination therewith,

a gear member pivoted on said hammer pin for pivotal movement independently of said hammer pin,

a gear-segment on said trigger meshing with said gear member for pivoting said gear member on manipulation of said trigger,

a sear mounted on one of said hammer and gear members for cocking engagement with the other, and



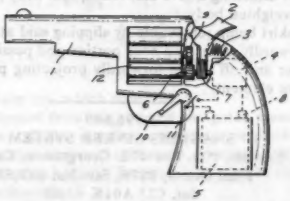
means for disengaging said sear from cocking engagement with said other member when said hammer member has been pivoted to a cocked position on retraction of said trigger in order to let said hammer member fall independently of said gear member under the pressure of said hammer spring.

3,996,687

HAND-GUN WITH ELECTRIC MOTOR DRIVE

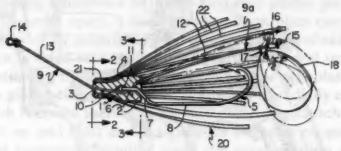
Edward Helbling, 393 E. 5th St., Brooklyn, N.Y. 11218

Filed Dec. 23, 1974, Ser. No. 529,273
Int. Cl.² F41C *19/12*
U.S. Cl. 42—84 **3 Claims**



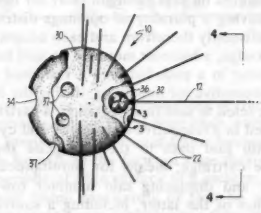
1. In a handgun, a combination comprising a handgun body; a cylinder mounted on said handgun body for indexing about an axis and having a plurality of openings distributed about said axis equidistantly therefrom and each adapted to accommodate a cartridge; a hammer mounted on said handgun body for displacement in a path between a retracted and a firing position and operative for impacting, during the displacement from said retracted to said firing position, a cartridge which is accommodated in a respective opening of said cylinder which is aligned with said path to thereby ignite the propellant charge of the cartridge; means for simultaneously indexing said cylinder and displacing said hammer toward said retracted position of the latter, including a source of electric power, an electric motor having an output shaft, an electric circuit supplying electric power from said source to said electric motor, an electric switch interposed in said electric circuit and operative for establishing and interrupting supply of electric power to said electric motor, a first gear transmission between said output shaft of said electric motor and said cylinder, and a second gear transmission interposed between said output shaft of said electric motor and said hammer; and means for displacing said hammer toward said firing position thereof, including at least one spring which is connected to and extends between said hammer and said handgun body, respectively, and which biases said hammer toward said firing position thereof.

3,996,688
FISHING LURE
James E. Hardwicke, III, 210 Horseshoe Circle, Columbia, S.C. 29204
Filed Oct. 7, 1975, Ser. No. 620,407
Int. Cl.² A01K 85/00
U.S. Cl. 43—42.09 16 Claims



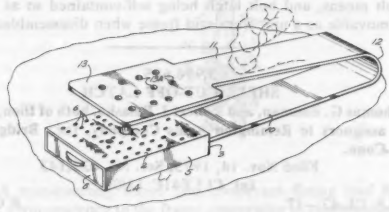
1. In a fishing lure, the combination of
a weighted body comprising
a main body portion, and
a nose portion of smaller transverse dimension than said main portion,
said nose portion projecting forwardly from said main portion;
hook means connected to said main portion of said weighted body and arranged to trail the same;
a wire means including a wire element extending longitudinally through at least said nose portion of said weighted body and projecting forwardly therefrom; and
a skirt comprising
an attaching sleeve, and
a plurality of flexible strands joined at one end to said attaching sleeve,
said attaching sleeve embracing said nose portion of said weighted body;
said skirt being removable by slipping said attaching sleeve forwardly off of said nose portion and passing said sleeve over and off of the forwardly projecting portion of said wire element.

3,996,689
SNAGLESS SINKER SYSTEM
Earl E. Lawless, P.O. Box 472, Georgetown, Calif. 95634
Filed Oct. 3, 1975, Ser. No. 619,552
Int. Cl.² A01K 95/00
U.S. Cl. 43—44.97 8 Claims



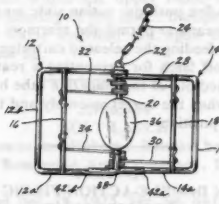
1. Apparatus for reducing the likelihood that a weighting device on a fishing line will become snagged on underwater obstructions, said apparatus comprising:
a hollow receptacle having a cross-section substantially larger than the cross-section of said weighting device, said receptacle having a leading portion including a relatively small aperture and a trailing portion having a relatively larger aperture for providing access to the interior of said hollow receptacle for said weighting device, the fishing line being adapted to pass through the small aperture to engage the weighting device when inserted through the large aperture; and
a plurality of elongate, substantially linear, flexible, resilient whiskers projecting outwardly from the leading portion of said receptacle and adapted to fend the receptacle off the underwater obstructions, the size of the receptacle further serving to prevent the weighting device from being snagged on such obstructions.

3,996,690
COMBINATION INSECT TRAP AND SWATTER DEVICE
Ronald W. Ridings, P.O. Box 185, Coburg, Oreg. 97401
Filed Jan. 9, 1976, Ser. No. 647,744
Int. Cl.² A01M 23/08, 3/02
U.S. Cl. 43—65 6 Claims



1. A combination insect trap and swatter device comprising,
a walled receptacle having a top wall defining a passageway opening for the entry of insects into the receptacle,
swatter means disposed above the receptacle top wall and adapted for forceful contact therewith, and
flexible arm means normally biasing said swatter means to a position above the top wall while permitting momentary closure of the swatter means against the top wall for insect killing purposes.

3,996,691
BODY GRIPPING KILLER TRAP
Raymond O. Reed, R.R. 3, Waverly, Iowa 50677
Filed July 11, 1975, Ser. No. 595,036
Int. Cl.² A01M 23/26
U.S. Cl. 43—93 12 Claims



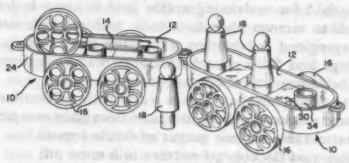
1. An improved body gripping killer trap comprising,
a pair of oppositely disposed jaws,
means pivotally mounting said jaws for movement about an axis between open and closed positions,
biasing means on said jaws to bias said jaws to a normally closed position,
a trigger having a pan portion and a jaw holding portion positioned between said jaws to releasably hold said jaws in an open position, means mounting said trigger for slidable and partially rotatable movement of said trigger about the pivotal axis of said jaws,
said trigger, including said pan portion and said jaw holding portion, when released moving towards the pivotal axis of said jaws whereby any animal that released said trigger is thrust deeper into said jaws.

3,996,692

CAR AND BOAT TOY WITH REMOVABLE PARTS

Robert H. C. M. Daenen, Aalst, Belgium, assignor to Dart Industries Inc., Los Angeles, Calif.

Filed Nov. 6, 1975, Ser. No. 629,243
Int. Cl.² A63H *33/08*
U.S. Cl. 46—17 4 Claims



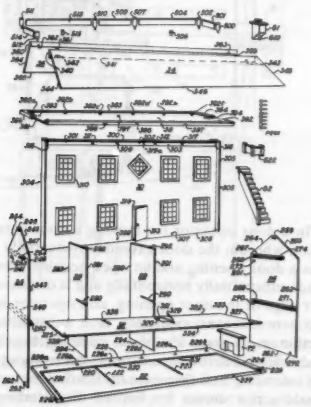
1. A toy vehicle suitable for use as either a rolling or floating device and including: a body member having a bottom wall and peripherally extending sidewall which together form a shallow open-topped box-like structure, said bottom wall further including at least two laterally extending passageways produced by upward projections therein, which passageways open through said sidewall, and at least one vertically extending protrusion having opposed recesses opening both to top and bottom of said body; elongated means firmly, but removably, positioned with said passageways and extending therebeyond, said means having terminal end portions of a size corresponding to said recesses; and wheel members having centrally positioned first openings engaged with said terminal end portions.

3,996,693

DOLL HOUSE INCLUDING DECORATIVE COLUMNS

Harry E. Walmer, 721 N. Overlook Drive, Alexandria, Va. 22305

Filed Sept. 23, 1975, Ser. No. 615,895
Int. Cl.² A63H *3/52*
U.S. Cl. 46—19 12 Claims



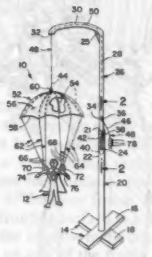
11. In an easily assembled knock-down type of doll house comprising a series of decorative columns disposed vertically across the front of the house, front wall means, side wall means, first floor means having a forward section extending beyond the front of said front wall means, and roof member means, wherein all said means are retained together as an assembled structure by pegs inserted in peg holes contained in said floor and wall means at their junctures, the provision of upper floor means for retaining said columns on said forward section of said first floor means, comprising an upper floor member, said wall means including means for retaining said upper floor member whereby said upper floor member is adapted to be inserted from and into the front of said doll house and retained in place parallel to said first floor means and between said side walls, each of said columns comprising bottom peg means and top hole means, said upper floor member comprising a forward section extending beyond the front of said front wall means, said forward section of said first floor means including a series of hole means wherein said bottom peg means of said columns can be inserted, said upper floor front section comprising a series of predrilled hole means adapted to be aligned with said hole means in the tops of said columns, fastening means adapted to be inserted in said respective hole means of said columns and said upper floor forward section.

3,996,694

PARACHUTE TOY

Edward Zinser, E. Meadow, N.Y., assignor to Lawrence Peska Associates, Inc., New York, N.Y., a part interest

Filed Feb. 27, 1975, Ser. No. 553,577
Int. Cl.² A63H *33/20*
U.S. Cl. 46—86 R 1 Claim



1. A parachute toy, which comprises:

a. a stand formed from two crossed elongated members;

b. a hollow tubular member extending perpendicularly upward from a center of said stand, an upper end of said tubular member having a longitudinally aligned slot aperture therethrough;

c. an L-shaped hollow tube having a shorter horizontal portion, with an open free end and a longer vertical portion, said longer vertical portion slidably contained in said upper end of said tubular member, a lower end of said L-shaped hollow tube having a hole therethrough;

d. a threaded bolt member affixed perpendicularly onto an outside peripheral portion of said L-shaped hollow tube between said hole and said lower end of said L-shaped hollow tube, said bolt member extending outwardly through said aperture of said tubular member;

e. a nut threadably engaging said bolt member and said nut abutting said outside periphery of said tubular member;

f. a cord member slidably contained with a bore of said L-shaped hollow tube, one end of said cord extending outwardly from said free end of said horizontal portion of said L-shaped hollow tube and another end of said cord extending outwardly through said hole of said L-shaped hollow tube;

g. a parachute portion having a plurality of curved rib members having a canopy affixed thereon;

h. an eyelet affixed to a top center of said canopy, said one end of said cord secured to said eyelet;

i. two sets of a plurality of cord lines affixed to said parachute portion;

j. a ring member affixed onto the lower ends of each said set of cord lines, each ring member adapted to receive one of the arms of a doll; and

k. a counter balance weight assembly affixed to said other

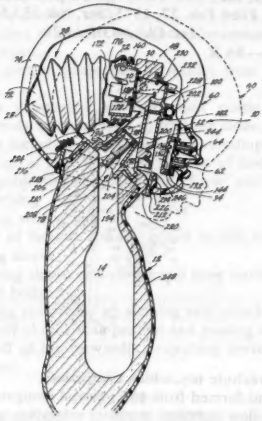
end of said cord, said counter balance weight assembly formed from a plurality of circularly shaped disc members, each said disc member having a central hole therethrough, said other end of said cord extending through said central holes of said disc members, and said other end of said cord being knotted.

3,996,695

SNEEZING DOLL

Jurgis Sapkus, Manhattan Beach, and J. Stephen Lewis, Pacific Palisades, both of Calif., assignors to Mattel, Inc., Hawthorne, Calif.

Filed Dec. 3, 1975, Ser. No. 637,336
Int. Cl.² A63H 5/00, 3/24
U.S. Cl. 46—118 5 Claims



1. In an animated figure toy including a head and a torso, said head having a nose provided thereon, the improvement which comprises:

means for movably mounting said head on said torso; means for supplying a liquid to said nose;

means for moving said head backward relative to said torso to a rear position in simulation of a sneezing seizure;

means for releasing said head from its rear position and suddenly thrusting it forwardly; and

means connecting said releasing means to said liquid supplying means for forcing said liquid through said nose upon release of said head from said rear position.

4.

A sneezing doll, comprising:

a torso;

a head;

means pivotably connecting said head to said torso;

a bellows mounted in said head for exerting a force between said head and said means pivotably connecting said head to said torso for rocking said head backward to a rear position when said bellows is pressurized;

means connected to said bellows for pressurizing it incrementally;

a relief valve connected to said bellows for suddenly relieving the pressure in said bellows and for issuing a sneezing sound when said head reaches said rear position; and

means biasing said head to a forward position so that said head will suddenly bob forwardly for simulating a sneezing seizure with accompanying sound when said pressure is relieved.

3,996,696

FLOCCULATION PROCESS

John C. Davidtz, East Amwell Township, Hunterdon County, N.J., assignor to Mobil Oil Corporation, New York, N.Y.

Division of Ser. No. 443,540, Feb. 19, 1974, Pat. No. 3,956,119. This application Nov. 19, 1975, Ser. No. 633,521
Int. Cl.² E02D 3/14
U.S. Cl. 47—58 2 Claims

1. A method for reclaiming arable land in areas hydraulically mined to recover phosphate rock, and in which mining process segregated overburden, exhausted mine pits, quartz sand tailings and fluid phosphate slimes waste are formed, wherein the improvement comprises:

admixing fluid phosphate slimes waste with a flocculant to produce a flocculated mixture, said flocculant comprising the extractable organic matter of fertile topsoil;

depositing said flocculated mixture in a mine pit;

separating water from said deposited flocculated mixture thereby producing a layer of dewatered floc; and

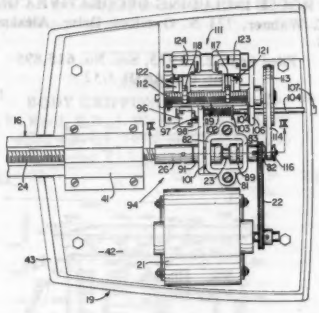
depositing overburden on top of said layer of dewatered floc, whereby to restore the original stable soil profile of an uppermost sandy layer with good drainage supported on a lower clay-rich layer with poor drainage.

3,996,697

DOOR OPERATOR WITH SCREW DRIVE

Morris W. Bailey, Fort Worth; Donald S. Harris; Nesbitt A. Boyles, both of Dallas, all of Tex., and Victor Sumnicht, Appleton, Wis., assignors to Overhead Door Corporation, Dallas, Tex.

Filed Dec. 24, 1975, Ser. No. 644,193
Int. Cl.² E05F 15/10
U.S. Cl. 49—28 11 Claims



1. In a door operator for moving a door between a closed position wherein the door extends substantially vertically and closes a door opening and an open position wherein the door extends substantially horizontally and is disposed adjacent the upper edge of the door opening, said operator including elongated screw means extending in a substantially horizontal direction away from the door opening, bearing means for supporting said screw means for rotation about the longitudinally extending axis thereof, said bearing means also supporting said screw means for limited displacement in the axial direction thereof, carriage means engaged with said screw means and movable axially therealong in response to rotation of said screw means, said carriage means having means thereon adapted for engagement with the door, motor means drivingly interconnected to said screw means for selectively rotating same in either rotational direction, whereby rotation of said screw means in a first rotational direction causes linear movement of said carriage means in one axial direction along said screw means so that said door is moved in a closing direction, whereby rotation of said screw means in a second rotational direction opposite said first direction causes linear

movement of said carriage means in the other axial direction along said screw means for moving said door in an opening direction, and reversing means cooperating with said screw means for causing the rotational direction of said screw means to be automatically reversed when said screw means is rotating in said first rotational direction due to said door striking an obstruction when moving in said closing direction, whereby said reversing means causes the door to be automatically moved in an opening direction, the improvement comprising:

stop means coacting with said screw means for preventing axial movement of said screw means in said one axial direction away from a preselected position, said stop means permitting axial movement of said screw means away from said preselected position in said other axial direction;

said reversing means including biasing means coacting with said screw means and urging same in said one axial direction for normally maintaining said screw means in said preselected position, said reversing means also including switch means associated with said motor means for reversing the rotation of said screw means when same is rotating in said first rotational direction; and

connecting means for causing actuation of said switch means in response to axial movement of said screw means in said second axial direction away from said preselected position.

3,996,698

HINGE ACTUATOR

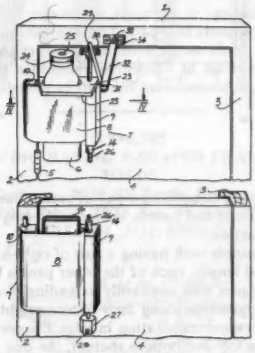
Robin Gore Rees, Portmarnock, and Patrick Mannix Branigan, Dublin, both of Ireland, assignors to Institute for Industrial Research and Standards, Dublin, Ireland

Filed Jan. 8, 1976, Ser. No. 647,474

Claims priority, application Ireland, Jan. 24, 1975, 135/75; Apr. 3, 1975, 748/75

Int. Cl.² E05F *15/04*

U.S. Cl. 49—324 **12 Claims**



1. In combination, a first member, a second member, a hinge connecting the first member to the second member and defining a hinge pivot axis for the members and a fluid pressure powered actuator for imparting angular movement to the first member relative to the second member in one sense about said axis, the actuator comprising:

mounting means on each member defining an anchorage position;

a flexible substantially inelastic retaining means connected between the two anchorage positions and subtending that angle between the two members which is reduced on the first member moving relative to the second member about said axis in said one sense;

an elongated inflatable conduit of substantially constant surface area, the conduit having its longitudinal axis substantially parallel to the hinge pivot axis and being disposed between the members and the retaining means; and

means for inflating the conduit to press outwards against the retaining means to cause the retaining means to exert a pulling force between the members to impart angular movement to said first member relative to said second member in said one sense about said axis.

3,996,699

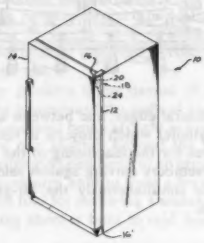
REFRIGERATOR DOOR CLOSURE APPARATUS

William P. Crowe, Louisville, Ky., assignor to General Electric Company, Louisville, Ky.

Filed July 14, 1975, Ser. No. 595,788

Int. Cl.² E05F *1/10*

U.S. Cl. 49—386 **6 Claims**



1. In a household refrigerator of the type including a door frame having a front face surface, a door mounted over the frame and having a confronting surface overlapping and spaced from the frame face surface, and means for pivotally connecting the door to the door frame, the pivotal axis being spaced from the confronting surface in a direction towards the door outer surface, the improvement comprising:

a striker mounted on one of the frame face surface or confronting surface and projecting from the surface on which it is mounted into the space between the frame face surface and the confronting surface;

a cam movably mounted on the other of said frame face surface or confronting surface at a location adjacent the striker and projecting from the surface on which it is mounted into the space between the frame face surface and the confronting surface for slidable engagement with the striker, said cam being biased into forcible contact with the striker and having a first portion of a configuration sufficient for urging the door toward the closed position in response to contact of said first cam portion and said striker; and

means for so biasing said cam.

3,996,700

PROCESS AND APPARATUS FOR FINISHING MAGNETIC HALF-CORE MEMBERS OF THE POT-CORE TYPE

Robert Delebecque, Sceaux, and André Jean Velte, Le Chesnay-Parly II, both of France, assignors to Societe Anonyme de Telecommunications, Paris, France

Filed Nov. 7, 1975, Ser. No. 629,920

Claims priority, application France, Nov. 27, 1974, 74.38835

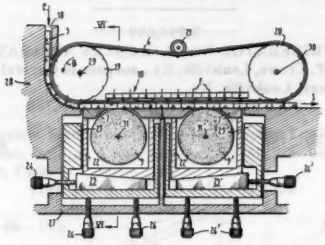
Int. Cl.² B24B *15/00, 1/00*

U.S. Cl. 51—3 **11 Claims**

1. A finishing process for magnetic half-core members of the pot core type, having, on the open side lateral edges requiring to be ground in order to obtain perfect fit of these edges when two half-core members are assembled, and having also a central annular part which is machined, in particular by means of an abrasive cylinder, in order to define an exact air-gap when two half-core members are assembled; the process comprising the following steps:

a. the parts to be machined are carried by a belt moving continuously past at least one tool; and

b. the half-core members are carried in such a way that the open side, with appropriate pressure on the base of the half-core members, moves against two parallel fixed surfaces, each having an abrasive coating, serving to machine the lateral edges, and between which is located an abrasive cylinder which projects in relation to the aforesaid surfaces for the machining of the lateral edges, said half-core members moving against said cylinder in order to machine simultaneously the air-gap to appropriate dimensions.

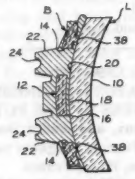


3,996,701

LENS BLOCK WITH PREFORM

Peter R. Ramirez, Southbridge, and Bertram R. Goodwin, Feeding Hills, both of Mass., assignors to American Optical Corporation, Southbridge, Mass.

Filed June 30, 1975, Ser. No. 591,670
Int. Cl.[2] B24B *13/00*
U.S. Cl. 51—216 LP 5 Claims



1. A lens block comprising a preform of rigid high melting temperature heat-absorbent non-metallic material, said preform being apertured; and

cast lens-holding and fixturing portions of metal of low melting temperature eutectic composition at each of opposite sides of said preform, said cast portions encasing all sides of said preform and extending through said apertures in interconnecting relationship with said lens-holding and fixturing portions, said fixturing portion comprising at least one boss having a fixturing socket means formed therein.

3,996,702

COATED ABRASIVE PRODUCT COMPRISING FUSED ZIRCONIA GRAINS AND METHOD FOR ABRADING IRON

Sidney M. Leahy, North Oaks, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Continuation of Ser. No. 527,432, Nov. 26, 1974, abandoned, which is a continuation of Ser. No. 99,716, Dec. 18, 1970, abandoned, which is a continuation-in-part of Ser. No. 722,172, April 18, 1968, abandoned. This application May 27, 1976, Ser. No. 690,599
Int. Cl.[2] B24D *11/00*; C09K *3/14*
U.S. Cl. 51—328 11 Claims

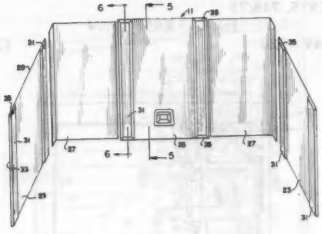
1. Coated abrasive sheet material especially suited for formation into endless belts, said sheet material having a durable, flexible woven cloth backing and abrasive grains firmly adherently bonded thereto by a hardened phenol-formaldehyde resin, at least 10% of the total weight of said grains consisting of fused zirconia, the balance of the total weight of said grains being no harder than fused alumina, whereby at high pressures an endless belt formed from said sheet material abrades, before failure, a significantly greater weight of free carbon-containing iron castings than does a belt of identical construction except for the use of abrasive grains free from fused zirconia.

3,996,703

WALL PANELING

Phillip D. Daniels, West Bloomfield, Mich., assignor to Novi Plastics Company, Novi, Mich.

Continuation-in-part of Ser. No. 557,271, March 11, 1975. This application Oct. 20, 1975, Ser. No. 623,802
Int. Cl.[2] A47K *3/16*
U.S. Cl. 52—35 11 Claims



1. Wall paneling comprising a pair of corner panels, a center panel and a pair of end panels, each panel being molded and of unit construction;

the corner panels each having a pair of right-angular walls, of unequal length, each of the other panels being flat on opposite faces with outwardly extending elongated marginal enlargements along their outer upright edges;

said enlargements terminating in edge flanges on one side and at the top and bottom thereof; the one enlargement of the end panels adjustably overlying and receivi g therein the corresponding portion of one wall of a corner panel, with the end panel substantially coplaner therewith respectively; the outer enlargements of the center panel adjustably overlying and receiving therein the corresponding other wall portion of said corner panels respectively, and substantially coplaner therewith,

said pair of end panels and said center panel each being of uniform height and each being of substantially uniform width for compact nesting assembly with each other and with said corner panels to permit the use of a container of a height and width of approximately the height and width of said end and center panels; and

adhesive means interposed between and securing said overlying portions of said end and center panel enlargements and the respective corner panel wall portion;

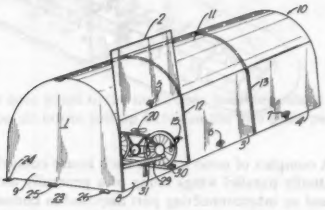
the edge flanges of said panel enlargements providing a snug sealing line contact with and along the corresponding underlying wall of an adjacent corner panel; so that said center panel is adapted to adjustably overly the edges of one wall of each corner panel and always present a finished edge and thereby cover the rough edges of said corner panels if trimmed during installation.

3,996,704

BIKE STORAGE DEVICE

Byron C. Huey, Hemet, Calif., assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

Filed Sept. 19, 1975, Ser. No. 614,894
Int. Cl.² E04B 1/346
U.S. Cl. 52—64 3 Claims



1. A bike storage device for removably storing a plurality of bikes, said bike storage device comprising

a linearly extending structure of lightweight plastic material having a plurality of doors, each selectively openable, closable and lockable, said structure having a floor;

a plurality of movably mounted partitions in the structure movable in directions of length of the structure for dividing the structure into a plurality of compartments;

fastening means for affixing the structure to a supporting surface; and

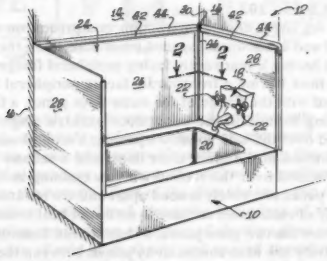
a plurality of rails in the structure in spaced substantially parallel relation on the floor of the structure, each of the rails being movably mounted on the floor at one end so that it is selectively adjustable in inclination with the floor, and each of the rails accommodating a bike.

3,996,705

WALL FACING HAVING V-SHAPED CHANNEL-LIKE FOLDS

William D. Gutierrez, 2046 Via Verde, Covina, Calif. 91724

Filed Feb. 3, 1975, Ser. No. 546,203
Int. Cl.² E04C 2/32; E04B 2/72
U.S. Cl. 52—71 6 Claims



1. A wall facing comprising:

a relatively stiff though flexible facing sheet having normally front and rear sides and a rearwardly reentrant generally V-shaped channel-like fold extending from one edge to the opposite edge of the sheet and defining at opposite sides of the fold a pair of adjacent panel sections,

each fold having confronting side walls formed by portions of said sheet and integrally joined to and projecting rearwardly in converging relation from the adjacent edges of the adjacent panel sections and integrally joining one another rearwardly of said panel sections to form a flexible hinge portion along the centerline of the fold at which said facing sheet may be bent to a folded configuration wherein the junctures of each fold side walls with the adjacent panel sections abut one another and the adjacent panel sections are disposed in substantially mutually perpendicular relation to conform to a corner formed by two facing sheet mounting walls,

said facing sheet having a substantially uniform thickness throughout said panel sections and each fold,

each panel section having outer edges along the edges of said facing sheet and integral rearwardly extending mounting flanges along said outer edges for seating against the mounting wall surfaces,

the adjacent edge portions of each pair of adjacent panel sections sloping forwardly at a small angle from the planes of the sections as said edge portions approach the intervening fold, and

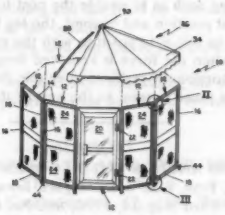
said sloping edge portions being devoid of said mounting flanges and said junctures of the walls of each fold and the adjacent panel sections being arcuate in cross-section and arching toward one another beyond the fold side walls whereby said edge portions bend to an arcuate configuration and said junctures abut to form a forwardly opening recess along the fold for receiving a sealant such as grout when said facing sheet is bent to said folded configuration.

3,996,706

PIVOT LINK FOR PORTABLE ENCLOSURE

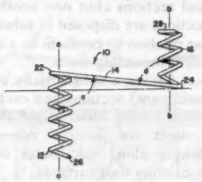
Roger Bomgaars, Potterville, Mich., assignor to General Aluminum Products, Inc., Charlotte, Mich.

Filed Sept. 8, 1975, Ser. No. 611,001
Int. Cl.² E04B 1/346
U.S. Cl. 52—71 14 Claims



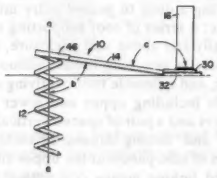
1. A portable enclosure including a series of panels hingedly connected together to form a closed polygon; one of said panels including a door to permit entry into and egress from said enclosure; a series of roof supporting members interconnected centrally and above said enclosure, said supports sloping downwardly in generally radial fashion and being affixed to said panels; and a flexible roof overlying said supports, each of said panels including upper and lower spaced horizontal frame members and a pair of spaced vertical members forming a rectangle; and linking means pivotably interconnecting adjacent pairs of said panels at the upper and lower horizontal members; said linking means comprising: at least one elongated individual flexible member extending between each adjacent pair of said panels; retainer means attached to each end of said flexible member for securing said flexible member to said horizontal members of adjacent panels to extend therebetween; and sealing means positioned between said panels, said flexible member allowing said adjacent panels to move relative to one another and said sealing means closing the gap therebetween.

3,996,707
GROUND ANCHOR FOR VOLLEYBALL AND LIKE GAMES
Norman V. Frye, R.R. 4, Davenport, Iowa 52804
Filed May 24, 1976, Ser. No. 689,059
Int. Cl.² E02D 5/74; A45F 3/44
U.S. Cl. 52—157 7 Claims



1. A ground anchor and post-supporting member of generally Z-shaped construction having a depending part disposed on a vertical axis and including screw means for screwing into the ground, a leg part having a fixed junction with the top of the depending part and extending away and downwardly therefrom at an angle of slightly less than ninety degrees and adapted to overlie the ground, and an upright part having a fixed junction with and arising from the end of the leg remote from the depending part and disposed initially on a vertical axis, the junction of the upright part with the leg likewise forming an angle of slightly less than 90°, the leg being straight in its extent between the junctions so that, when the depending part is screwed vertically into the ground to the point where the junction of the leg and the upright part initially contacts the ground, the leg inclines downwardly from the top of the depending part to the bottom of the upright part and the axes of the two parts are parallel, said leg being flexible in bending to enable manual lifting of the leg for further screwing of the depending part into the ground to a position in which the leg lies flat on the ground and the upright part tilts toward the depending part axis extended, said upright part being constructed to receive and support a post, and the flexibility of the leg being such as to enable the post to be moved forcibly to a vertical position and beyond, the leg being resilient so as to recover its flat-wise position with the upright part tilted as aforesaid when the force is removed from the post, said leg being also torsionally resilient to enable the upright part to be rocked in a plane normal to the axis of the flat-wise leg.

3,996,708
GROUND ANCHOR WITH LOOPED TOP SUPPORT
Norman V. Frye, R.R. 4, Davenport, Iowa 52804
Filed May 24, 1976, Ser. No. 689,060
Int. Cl.² A45F 3/44; E02D 5/74
U.S. Cl. 52—157 15 Claims



1. A ground anchor and post support comprising a generally L-shaped member having a first vertical portion in the form of a helix adapted to penetrate the ground and a second portion extending generally horizontally from the top of the helix, said second portion being of hairpin shape having a pair of generally horizontally coplanar and spaced-apart legs joined by a bight relatively remote from the helix, a first of said legs being fixed to the top of the helix and the second of said legs having its terminal end proximate to the top of the helix, and a substantially upright post-supporting member rigidly secured to and rising from the bight.

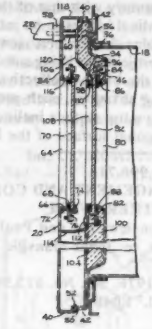
3,996,709
PATIO HOUSING COMPLEX
Weld Coxe, Philadelphia, Pa., assignor to Weld Incorporated, Columbia, S.C.
Filed June 4, 1975, Ser. No. 583,645
Int. Cl.² E04H 1/00
U.S. Cl. 52—169 DT 8 Claims

1. A complex of patio houses, each house comprising a pair of mutually parallel wings being of a generally mobile home type and an interconnecting part disposed in connecting relation to said wings, wherein said complex comprises a series of at least two said houses, with adjacent houses in said series having separator walls therebetween which separator walls are distinct from, non-integral with, and do not comprise the walls of any said houses; said separator walls in each series being generally parallel to each other and being of masonry-like construction, each said house being arranged with its wings being disposed generally perpendicular to associated said separator walls and having at least one end of each wing adjacent a said associated separator wall, each said house having at least one patio zone bounded by the two wings, the interconnecting part, a said associated separator wall, and an access opening to said patio zone, with at least one of the wings of each said house being of a lesser length than the spacing between the separator walls at opposite ends of the house comprising means that together with said spaced separator wall defines said access opening.

3,996,710
SIMPLIFIED OVEN DOOR WINDOW
James J. Nuss, Louisville, Ky., assignor to General Electric Company, Louisville, Ky.
Filed Apr. 11, 1975, Ser. No. 567,374
Int. Cl.² E06B 6/26; F23M 7/00
U.S. Cl. 52—202 6 Claims

1. An oven door construction comprising an outer door panel and a rearwardly spaced inner door liner, the outer door panel having a rearwardly facing peripheral flange, said inner door liner having a frontwardly facing peripheral flange telescoped with the flange of the outer door panel, a first window opening formed in the outer door panel, a single glass pane sealed over the said window opening, a second window opening formed in the inner door liner, and a second single glass pane sealed over the second window opening so that the two glass panes are widely spaced apart and are mounted independently of each other so there is no direct heat conductive path between the two glass panes, widely spaced fastening means of relatively low heat conductivity joined between the outer door panel and the inner door liner along the bottom edge and adjacent the top edge of the door, a layer of thermal insulation within the inner door liner surrounding the second glass pane, and an insulation guard fastened within the inner door liner, said insulation guard having a window opening in general alignment with the said second window opening, the insulation guard including a frontwardly facing flange just beneath the

second window opening which reaches to the outer door panel and serves to substantially divide the interior of the door from



the outer door panel to the inner door liner and retard air flow and hence air-borne soil up between the two glass panes.

3,996,711

WALLS

Jonathan Clive Pearson, Sheffield, England, assignor to Ellis Pearson & Co. Limited, Great Britain

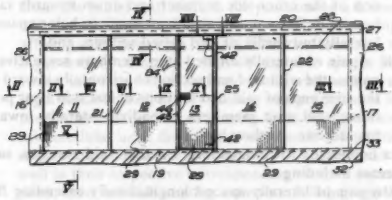
Filed Apr. 10, 1974, Ser. No. 459,597

Claims priority, application United Kingdom, Apr. 12, 1973, 17571/73

Disclosure was also published under second Trial Voluntary Protest Prog ram on Feb. 17, 1976

Int. Cl.² E06B *1/04*; **E04B** *5/56*; **E06B** *3/70*

U.S. Cl. 52—207 **9 Claims**



1. An assembly for forming a wall substantially of glass comprising a plurality of glass sheets in abutment to each other, a pair of side channels with resilient linings fitted to the end pair of glass edges, a bottom channel with a resilient lining fitted along the bottom edges of the glass sheets, a top channel with a resilient lining fitted along the top edges of the glass sheets, a pillar overlapping each pair of abutting glass edges on only one side of said glass sheets and spaced therefrom by a resilient strip to provide intermediate support for said glass sheets, a door comprising a glass sheet, pivots secured to the door and to the top and bottom channels, a pair of pillars flanking the door, and a latch carried by the door and engageable with one of the pillars flanking the door, the door being provided with a small hole for access to the latch from the face of the door remote from the latch.

3,996,712

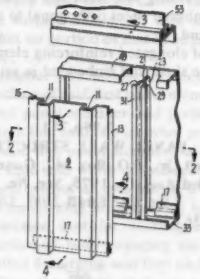
METAL BUILDING

John D. Howell, Burlingame, Calif., assignor to Aluminum Plumbing Fixture Corporation, Burlingame, Calif.

Filed June 19, 1975, Ser. No. 588,215

Int. Cl.² E04H *1/00*; **E04B** *2/00, 2/32*

U.S. Cl. 52—241 **2 Claims**



1. A metal building construction comprising in combination:

a. an interior building wall having outwardly extending members at spaced intervals, said outwardly extending members having a planar U-shaped vertical slot at the terminal ends,

b. a lower sill, said lower sill having an upwardly extending lip at substantially the position occupied by a front panel of the building,

c. a plurality of panels, each of said panels having a bottom edge, said bottom edge being provided with at least one clip which clips over said lip,

d. each of said panels having planar edge flanges on both edges extending inwardly, said edge members being adapted to sit snugly into said U-shaped slots,

e. a top cap having front and back downwardly extending lips, whereby the back lip will extend over the interior wall of the building and the front lip will extend over the exterior wall of the building,

f. means for holding said top cap in place on said building structure, and

g. said top cap and said clip constituting the sole means of holding said panels against horizontal movement.

3,996,713

PREFABRICATED MULTI-LAYER STEEL-REINFORCED CONCRETE PANELS

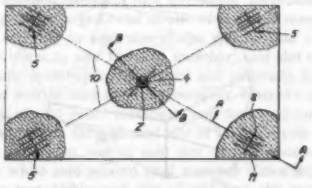
Ernst Haeussler, Grashofstrasse 47, 4300 Essen-Bredeney, Germany

Filed Mar. 31, 1976, Ser. No. 672,338

Claims priority, application Germany, Apr. 2, 1975, 2514300

Int. Cl.² E04B *2/28*

U.S. Cl. 52—309 **15 Claims**



1. A prefabricated multi-layer panel comprising:

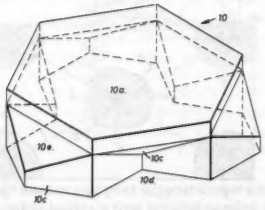
a pair of spaced-apart and coextensive steel-reinforced concrete plates;

an insulating layer sandwiched between said plates;
a tubular main anchor extending between said plates and reaching into each of them, said main anchor being positioned at the centroid of at least one portion of said panel;
elongated reinforcing members laterally projecting from said main anchor and embedded in the concrete plates;
at least one planar auxiliary anchor spaced from said main anchor, reaching into both said concrete plates and having a membrane sheet orthogonal to a radius of said main anchor; and
a plurality of elongated reinforcing elements traversing said membrane sheet and embedded in said concrete plates.

3,996,714
PANEL WALL STRUCTURE
Earl T. Hazelett, Jr., P.O. Box 342, Gunnison, Colo. 81230
Filed Aug. 11, 1975, Ser. No. 603,331
Int. Cl.² E04B *2/00, 5/52*
U.S. Cl. 52—367 **2 Claims**

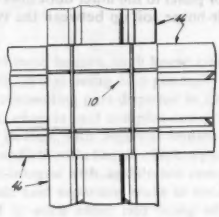
1. A wall panel having an outline frame provided with inwardly diverging and outwardly converging cross section; concrete cast in said outline frame and anchored in said inwardly diverging portions of said outline frame; said outline frame having opposite sides, the diverging portions of said opposite sides of said frame divergingly directed toward each other; at least one cross member extending through said concrete and welded to opposite sides of said frame.

3,996,715
BUILDING BLOCKS
Brian Edward Wesley Dowse, Reading, England, assignor to Golder Hoek and Associates Limited, Maidenhead, England
Filed Nov. 24, 1975, Ser. No. 634,841
Claims priority, application United Kingdom, Dec. 18, 1975, 54564/75
Int. Cl.² E04C *1/10*
U.S. Cl. 52—593 **1 Claim**



1. A one piece building block comprising an upper portion of generally hexagonal cross-section, and a lower portion providing load bearing projections which when the block is viewed in top plan project outwardly from alternate sides of the upper portion, each projection extending substantially the entire length of its respective side, the lower portion providing recesses of shape complementary with that of the projections to enable a plurality of identical blocks to be interlocked, the projections being of triangular shape when viewed in bottom plan, the apex angle of the projections being substantially 120° so that the base surface of the block is effectively formed by three identical and touching hexagons, each projection when viewed from the side having a top surface inclined at approximately 45° to the top hexagonal surface of the block.

3,996,716
CEILING GRID ARRANGEMENT AND CONNECTOR USED THEREWITH
Gilbert Wallace Tuten, Glenview, Ill., and Paul Lewis Earle, Denver, Colo., assignors to Johns-Manville Corporation, Denver, Colo.
Filed Sept. 15, 1976, Ser. No. 613,596
Int. Cl.² E04B *5/52*
U.S. Cl. 52—665 **4 Claims**



1. A ceiling grid system comprising:
a. a plurality of support runners, each of which includes
i. a horizontally extending, longitudinal base including an intermediate raised section extending the length of the base,
ii. a pair of horizontally extending side members connected with and extending up from said base on opposite sides of and spaced from said raised section, said side members including adjacent laterally aligned end sections, each of which has an uppermost portion which bends in towards the laterally aligned end portion of the other side member and down towards said base to define a recess, said bent portions being spaced laterally outwardly of said raised section, and
iii. a pair of laterally aligned stop members respectively connected with said end sections horizontally inward of the free ends of said end sections below said bent portions, said stop members extending laterally inward toward one another; and
b. a connector for connecting together said runners, said connector including
i. a pair of laterally spaced longitudinally extending flat prongs for each support runner to be connected therewith, each of said prongs having a free end section located within an associated runner between its intermediate raised section and one of its side members, spaced laterally from said raised section and extending up from the base of the associated runner, said end section extending to an associated stop member and having a longitudinally extending top portion located within the recess defined by the bent portion of said one side member, and
ii. a guide and reinforcing element connected with an end section of each of said prongs below the end section's top portion which is located within an associated recess, each of said elements extending towards and laterally aligned with an adjacent side of the raised section of an associated runner and having a free end adjacent said adjacent side of said raised section.

3,996,717

METHOD OF BUILDING A WALL SURFACE LINKED UP WITH AN INITIAL WALL AND HAVING PREDETERMINED RELATIVE SHAPE AND POSITION

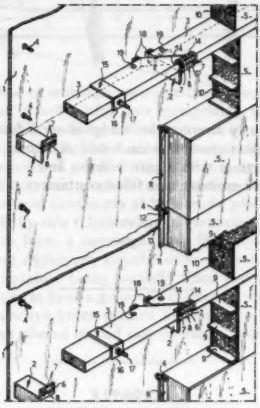
Guy Sallenave, Pornichet; André Chémereau, St-Nazaire; Jean-Paul Pomies, St-Nazaire; Georges Thomas, St-Nazaire, and André Massanés, St-Nazaire, all of France, assignors to Chantiers de l'Atlantique, Paris, France

Filed Dec. 5, 1974, Ser. No. 529,923

Claims priority, application France, Dec. 20, 1973, 73.45816

Int. Cl.² E04G *21/00, 23/00*

U.S. Cl. 52—744 9 Claims



1. A method of building in particular by means with juxtaposed modular units a real reference wall surface which, with respect to an initial wall surface, has an accurate geometrical definition and a prescribed relative nominal position which is predetermined at least locally with respect to said initial wall surface and is at least approximately flat, said reference wall surface forming at least a portion of a liquefied-gas storage tank, wherein the improvement comprises the steps of:

previously determining a prescribed nominal distance value from the initial wall surface for positioning a framework adapted to support the modular units, positioning and affixing said framework to said initial wall surface, injecting a sealing compound into all the void spaces left between said framework and said initial wall surface, applying a suitable temporarily sealing compound to at least a predetermined portion of bearing faces of at least some of said modular units facing said initial wall and positioning said modular units on said framework against said initial wall in their respective corresponding relative exact positions, said suitable sealing compound being applied as coating and coated with a thickness and amount large enough to fill up any free spaces left between said initial wall surface and said portions of the bearing faces of said modular units, thereby serving as an intermediate steadying layer for retaining said modular units against motion.

3,996,718

FASTENING APPARATUS FOR PANELS

R. Montgomery Welch, Grand Rapids, Mich., assignor to Modular Systems, Inc., Fruitport, Mich.

Filed July 28, 1975, Ser. No. 599,713

Int. Cl.² F16B *5/06*

U.S. Cl. 52—756 14 Claims

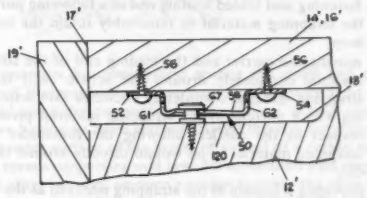
1. A joint structure comprising:

a first panel member and a second panel member having surfaces in contacting relationship;

said second panel member having a recessed area along one surface which surface is in contact with said first panel member and said one surface opening into a second surface which intersects said one surface, said recessed area including a predetermined width, a bottom, and upstanding side walls;

a stud member secured within said recessed area and including an enlarged head spaced above said bottom but below said one surface in contact with said first panel member such that no portion of said head extends beyond said one surface;

a resilient clip member and means for securing said clip member to a surface of said first panel member in contact with said second panel member and juxtaposed to said recessed area such that said clip member protrudes above said surface of said first panel member; said clip member being narrower than said width of said recessed area and including a raised central section having a slot extending therealong, and an opening to said slot at least at one end of said central section; said slot receiving said stud member with said enlarged head engaging the underside of said central section for urging said first and second panel members together along said surfaces; whereby when assembling said panel members, one of said panel members is moved relative to the other such that said clip member is brought within said recessed area for receipt of said stud within said slot, said walls of said recessed area guiding said clip member or vice versa such that said stud enters said slot and prevents skewing of said panel members with respect to each other during assembly;



said slot in said clip member opening at both ends of said central section, said clip being made of a strong resilient material so as to flex and provide a yielding force to said stud member as said stud member is forced into said slot; said structure including a stop means for limiting relative movement between said panel members such that said stud member is positioned along said slot in said clip member;

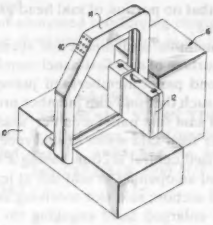
said recessed area includes a second stud member like the first stud member spaced from said first stud member within said recessed area; said first panel member including a second clip member; means for securing said second clip member in alignment with the first of said clip members; said second clip member also being narrower than said width of said recessed area and including a raised central section having a slot extending therealong for receiving the enlarged head of one of said stud members, and an opening to said slot at the end of said central section closest to said first clip member; said slot in said second clip member being aligned and generally parallel with said slot in said first clip member whereby during assembly of said panel members, said first stud member slides completely through said slot in said first clip member and comes to rest in said slot of said second clip member while said second stud member slides into and comes to rest within said slot of said first clip member, said walls of said recessed area guiding the engagement of said clip members and stud members together with the engagement of said stud members and slots to prevent skewing of said panel members during assembly.

3,996,719

AUTOMATIC BAG STRAPPER

Wojciech M. Dabrowski, West Allis, and Elwood B. Brown, Cedarburg, both of Wis., assignors to Rexnord Inc., Milwaukee, Wis.

Filed Feb. 27, 1975, Ser. No. 553,721
Int. Cl.² B65B *13/10*
U.S. Cl. 53—3 12 Claims



12. A method for applying a strap about an article, such as baggage, packages, etc., comprising the steps of:

a. feeding a leading end of a limp, flexible strapping material from a material supply to a position adjacent the article to be strapped;

b. placing the leading end of the strapping material adjacent a portion of the movable carrier;

c. folding the leading end back over the portion of the movable carrier so as to form a loop therearound;

d. fastening said folded leading end to a following portion of the strapping material to removably retain the end in a loop;

e. moving the carrier and the leading end of the strapping material completely around the article such that the strapping material completely encircles said article during which movement the strapping material pivots with respect to the carrier, allowing the remainder of the strapping material to be wound directly around the article;

f. providing a tension in the strapping material as the carrier traverses its path around the article, thereby limiting the amount of material drawn out of the material supply to a length no greater than the circumference of the article being strapped within a wide range of article sizes without requiring retraction of the excess material;

g. attaching the leading end of the strapping material to a following portion of the strapping material so as to retain the strap about the article;

h. severing the strapping material between the strap formed about the article and the strapping material supply; and

i. removing the strapping material leading end from the movable carrier.

3,996,720

YARN CUTTING AND PACKAGING MACHINE

Leon Hayduchok, 15 Sandy Lane, Trenton, N.J. 08610

Filed Jan. 12, 1976, Ser. No. 648,583
Int. Cl.² B65B *19/34, 63/02, 63/00*
U.S. Cl. 53—23 12 Claims

8. A method of cutting and packaging a bundle of yarn comprising the steps of:

guiding a plurality of continuous strands into a single coherent bundle of strands of substantially parallel orientation;

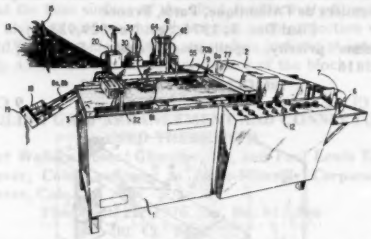
periodically clamping said yarn bundle at a selected position and advancing said bundle forward a preselected distance to a second position;

periodically advancing said bundle beyond said second position a preselected distance beyond the plane of cutting means and cutting a preselected length from said bundle;

periodically depositing each said cut yarn bundle in a product chute;

furnishing a series of containers to register with the forward end of said product chute in synchronism with the motion of said yarn clamping and yarn advancing means;

internally pushing each said cut yarn bundle to the forward end of a wedge-shaped product chute;



simultaneously moving the wedge-shaped forward end of said product chute into each said container in turn to fill said container with a yarn bundle; and

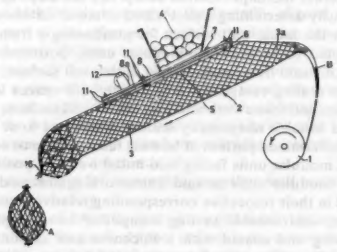
sealing and removing said filled containers.

3,996,721

COMMODITY PACKAGING

Frank Brian Mercer, Blackburn, England, assignor to F. B. Mercer, Limited, England

Filed Nov. 12, 1974, Ser. No. 523,065
Claims priority, application United Kingdom, Nov. 23, 1973, 54527/73; Mar. 13, 1974, 11131/74
Int. Cl.² B65B *9/14, 41/18*
U.S. Cl. 53—27 26 Claims



1. A method of forming commodity packages comprising continuously conveying a tubular flexible dimensionally unstable packaging net axially, continuously axially slitting the packaging net, grabbing the severed edges of the packaging net defining the slit, positively guiding the severed edges while expanding the distance between the severed edges to define an opening and bringing together said severed edges downstream of said opening, axially sealing said severed edges together so that the net reverts to a continuous tube with an axial seal, transversely sealing said net downstream of said axial sealing to provide a commodity-receiving section, introducing commodity to the interior of said section of said net subsequent to the sealing of the severed edges and severing and sealing said section containing commodity to provide a commodity-containing package.

3,996,722

METHOD OF MAKING A CARTRIDGE

Frederick William Bernhardt, 39 Algernon St., Oatley, N.S.W. 2223, Australia

Division of Ser. No. 371,653, June 19, 1973, abandoned. This application Jan. 16, 1975, Ser. No. 541,667

Claims priority, application Australia, June 19, 1972, 9381/72; June 18, 1973, 57053/73

Int. Cl.² B65B 3/16, 9/12

U.S. Cl. 53—37 8 Claims

1. The method of making a cartridge containing inter-active components of a self-setting mix comprising the following steps of separately locating a first component of self-setting mix in a first tubular flexible container, separately locating a second component of a self-setting mix in a second tubular flexible container, said containers extending longitudinally, sealing each of said containers at both ends, placing the containers in a side-by-side relationship and securing said containers together to form a cartridge, said first container being filled to assume a generally circular cross-sectional shape and said second container being partially filled and forming said second container to have a generally convex outer surface and a generally concave inner surface in contact with said first container when placed in said side-by-side relationship.

3,996,723

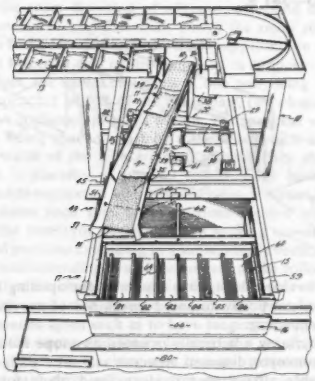
ARTICLE COLLATOR

Joseph Daniel Greenwell, Florence, Ky., assignor to R. A. Jones & Company, Inc., Covington, Ky.

Filed Mar. 28, 1975, Ser. No. 563,095

Int. Cl.² B65B 57/10, 57/20

U.S. Cl. 53—59 R 12 Claims



1. A collator for articles comprising,

a conveyor pivoted at its upstream end to swing its downstream end to any of a number of discharge points,

means for swinging said conveyor to said discharge points to drop one of said articles at each of said discharge points,

an upper receiver at said discharge end to receive articles from said conveyor,

a plurality of spaced parallel ribs in said upper receiver forming a plurality of compartments for the receipt of articles at said discharge points,

a lower receiver below said upper receiver for receiving a plurality of groups of articles from said upper receiver,

trap doors forming the bottom walls of said receivers,

and means for selectively opening said trap doors to first collect and drop a layer of articles from said upper receiver and to collect and drop a plurality of articles from said lower receiver.

3,996,724

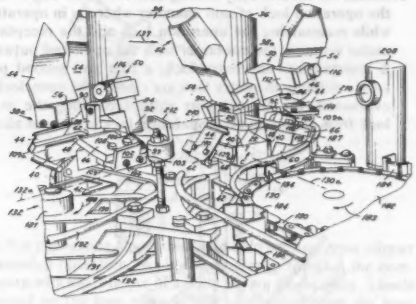
ROTARY CARTON CLOSING AND SEALING APPARATUS

Donald E. Smith, Novi, Mich., assignor to Ex-Cell-O Corporation, Troy, Mich.

Filed Oct. 16, 1975, Ser. No. 623,136

Int. Cl.² B65B 57/02, 7/04, 7/06, 51/22

U.S. Cl. 53—76 38 Claims



1. Apparatus for closing and sealing the open end of a carton of thermoplastic coated paperboard material or the like, said apparatus comprising: a pair of jaws, at least one of said jaws having an anvil surface formed thereon for supporting one outer surface of the layers of an end of a carton to be sealed; means supporting said jaws for movement with respect to each other between an open position to cause the open end of a carton received therebetween to be folded closed with one outer surface of the layers of the closed carton end being disposed to engage said anvil surface of said one jaw; vibration welding means including a horn that vibrates at a predetermined frequency when energized; said horn being movable relative to said jaws between a retracted inactive position and an extended sealing position, said horn having a work surface that engages the opposite outer surface of the layers of a closed carton end received between said jaws in their closed position to clamp the layers of the closed end between the work surface of the horn and the anvil surface of said one jaw to weld the clamped layers together upon vibration of said horn; and a latch member supported for movement between a locked position engaging said one jaw in the closed position of said jaws for locking said jaws against movement from their closed position, and a released position disengaged from said one jaw to permit movement of said jaws from their closed position to their open position.

3,996,725

APPARATUS FOR FILLING AND HERMETICALLY SEALING THERMOPLASTIC CONTAINERS UNDER VACUUM

Wilhelm E. Walles, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

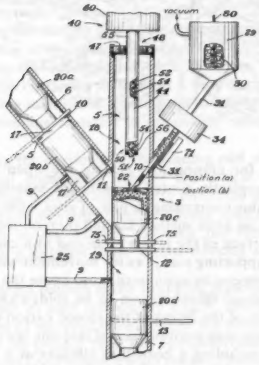
Filed May 21, 1973, Ser. No. 362,560

Int. Cl.² B65B 31/02

U.S. Cl. 53—94 1 Claim

1. An apparatus for filling a thermoplastic container with material under vacuum and then sealing the container comprising:

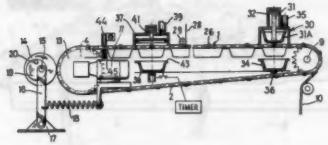
1. a housing defining an inlet for receiving a thermoplastic container having an open end through which the container can be filled with material, a chamber for enclosing the container while the container is being filled, and an outlet for discharging the container after it is filled and sealed;
2. a plurality of port valves disposed within said chamber, said valve means, when closed, subdividing said chamber into at least three air locks including in sequential order an entry lock, an operation lock and an exit lock and, when opened, permitting the passage of the container therethrough;
3. an evacuating means in communication with each of the three air locks;
4. a receptacle holding the material under vacuum in communication through a conduit with said operation lock; and
5. means for hermetically sealing said container disposed in the operation lock of said chamber whereby in operation while maintaining the operation lock and the receptacle under vacuum, the container with the open end outward is inserted into the entry lock, a first and second port valves defining the entry lock are closed, the entry lock is evacuated, the second port valve separating the entry lock from the evacuated operation lock is opened allowing the container to gravitate to a position in the operation lock such that the open end of the container is in communication through the conduit with the receptacle, a desired amount of the material is conveyed under vacuum from the receptacle into the open end of the container, the open end of the container is hermetically sealed by activating the remote controlled means, a third port valve separating the operation lock and the exit lock previously evacuated is opened allowing the container to gravitate into the exit lock, said third port valve is closed and a fourth port valve separating the exit lock from the outside is opened allowing the container to pass out of the apparatus wherein the means for sealing the container comprises a reciprocal, rotatable hollow shaft slidably disposed lengthwise in the operation lock and having a socket for receiving and holding a thermoplastic plug located at the end of said shaft extending into said operation lock, means for rotating and reciprocating said shaft and means for supplying at timed intervals thermoplastic plugs through the hollow of said shaft to said socket whereby in operation the means for supplying the plugs urges a plug into the socket and the shaft is moved to insert the plug into the open end of the container and rotated thereby fusing the plug to the container and forming a hermetic seal.



3,996,726
PACKAGING MACHINE

Kurt Schlachter, Wallau, Lahn, Germany, assignor to Kramer & Grebe GmbH & Co. KG Maschinen- und Modellfabrik, Wallau, Lahn, Germany

Continuation-in-part of Ser. No. 591,862, June 30, 1975, abandoned. This application Feb. 12, 1976, Ser. No. 657,589
Int. Cl.² B65B 31/02
U.S. Cl. 53—112 A 6 Claims

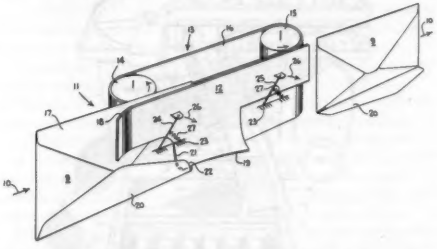


1. In a packaging machine having a deep-drawing station for the manufacture of the lower parts of the packages from an endless lower sheet, a vacuum chamber for evacuating and closing the packages with an upper sheet, a control for the stepwise advance of the sheets and having two endless chains having clamps thereon for engaging and transporting the lower sheet at its edges, which chains are driven by a motor, the improvement comprising a measuring wheel having a certain circumference, a trip cam rotatable with said measuring wheel to effect a shutting off of said motor after a predetermined rotatable movement of said measuring wheel, and a cam disk coupled with said measuring wheel, a motor speed control device engaged by said cam disk to control the speed of the motor in relationship to the advance movement of said sheet.

3,996,727
ENVELOPE FLAP SEPARATING MECHANISM

Robert Irvine, Riverside, and Harry E. Luperti, Wilton, both of Conn., assignors to Pitney-Bowes, Inc., Stamford, Conn.

Filed Jan. 13, 1976, Ser. No. 648,752
Int. Cl.² B65B 43/39
U.S. Cl. 53—381 R 1 Claim



1. An envelope deflapping apparatus for opening the flaps of unsealed vertically oriented envelopes of varying thicknesses, comprising:

means defining a vertically oriented envelope feed path;

a belt conveyor disposed adjacent said feed path which is rotatably affixed to provide a fixed plane for a body portion of an envelope being transported thereby;

a ski-like stripper member disposed adjacent said conveyor and movably biased toward said conveyor to provide a normal force for envelopes of varying thickness being transported by said conveyor, said ski-like stripper member comprising an upper curved portion for guiding said body portion of an envelope into a bite formed between said conveyor and said stripper member, and a lower flaired portion for engagement with a flap portion of an envelope, said lower flaired portion causing the flap por-

tion of the envelope to separate from the body portion of the envelope as said envelope is transported past said stripper member by said belt conveyor; and

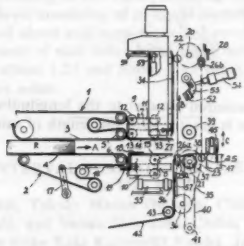
a parallelogram linkage connected to said stripper member for causing said stripper member to uniformly translate with respect to said belt conveyor, whereby envelopes of varying thickness will be uniformly accommodated and transported in the bite formed between the conveyor and said stripper member.

3,996,728

APPARATUS FOR WRAPPING PAPER REAMS AND THE LIKE IN SHEETS CUT OFF A CONTINUOUS PACKING WEB AND FOR ADJUSTING THE SIZE OF SUCH SHEETS ACCORDING TO THE REAM SIZE

Vittorio Gentili, Via Caprarie, 3, Bologna, Italy

Filed Dec. 10, 1975, Ser. No. 639,554
Claims priority, application Italy, Dec. 13, 1974, 3566/74
Int. Cl.² B65B *41/12*
U.S. Cl. 53—389 7 Claims



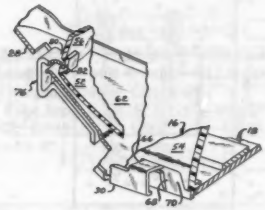
1. An apparatus for wrapping paper reams and the like in sheets cut off a continuous packing web and for adjusting the size of such sheets according to the ream sizes, characterized in that it comprises a ream conveyor, a first shaft supported downstream of said conveyor and below the ream supporting surface, said first shaft being arranged transversally with respect to the ream direction of advance, a second shaft supported parallel to said first shaft above the ream supporting surface, a first pair of sprocket wheels supported on said first shaft, and a second pair of sprocket wheels supported by said second shaft, the sprocket wheels of one pair being coplanar with the sprocket wheels of the other pair, two chains passed around the coplanar sprocket wheels, the sprocket wheels of each pair being spaced apart by a distance which is greater than the width of the web material whereoff the sheets are being cut, a plurality of parallel rollers, each having their opposite ends supported idle in said chains, a means for driving the chains such that those portions thereof which are adjacent the conveyor outlet end are moving upwards from below, said portions extending in a substantially vertical plane, a vertical wall extending in a plane tangent to the rollers which are located at the chain upward moving runs, a pair of rotating drive rollers supported downstream of said upward moving runs and spaced apart such as to have tangent planes in alignment with the upper and lower faces of the reams, a means effective to guide the packing web material between said idle rollers and said drive rollers, a transversally supported bar downstream of said drive rollers and arranged to reciprocate in a vertical direction, locking members positioned on said bar and effective to retain the packing web material when the bar is at its lower stroke limit, a blade or cutting edge secured to said bar for cutting across the web material when the latter is retained by said locking members, switch members displaced along the chain path and actuated by elements integral with the chains, said elements being adapted to first control the chain drive means in order to stop the chains when a predetermined length of web material has been unwound by the idle roller directly underneath it, then the bar driving means in order to determine the releasing mode thereof, and lastly again the chain drive means to allow the web material stretching along said vertical wall, there being finally provided a pad means for holding the packing web material termination against said wall.

3,996,729

STANDUP OPERATED PORTABLE HAND GRASS TRIMMER

Edward A. Irelan, Columbia, Mo., and Larry D. Annis, Elgin, Ill., assignors to McGraw-Edison Company, Elgin, Ill.

Filed Feb. 24, 1975, Ser. No. 552,327
Int. Cl.² A01D *35/02*
U.S. Cl. 56—16.7 4 Claims



1. For converting a portable hand held electric grass clipper for standup operation as a lawn trimmer or the like, the combination with said clipper of a dolly having a base plate, wheels mounted on the base plate, a pole upstanding from the base plate, and a handle on the upper pole end; said clipper having a housing with a generally continuous bottom wall and opposed side walls and a rear wall upstanding therefrom and cutting blades cantilevered forwardly away from the housing in a direction generally parallel to the bottom wall, each of the side walls of the housing having an L-shaped recess including one leg extending upwardly from the housing bottom wall and including another leg angled rearwardly therefrom toward the housing rear wall and further the rear wall of the housing having an open recess; said dolly base plate being shaped to conform generally to the housing bottom wall and having a pair of upstanding arms spaced apart sufficiently to straddle the housing side walls and a locking tab inwardly extended from the upper end of each arm, a locking element and means supporting the locking element relative to the base plate for movement between spaced locking and release positions, the dolly base plate being designed to underlie the clipper housing where the locking tabs fit in the side wall recesses and the locking element fits within the housing rear wall recess to confine the housing on the dolly, where movement of the locking element to the release position is required to allow placement of the housing on the dolly or removal of the housing from the dolly, and means for normally maintaining the locking element in its locking position.

3,996,730

MACHINE FOR HARVESTING GRAPE-BERRIES FROM GRAPE-BUNCHES

Walter Dorfer, via Hoffer, 39010 Nalles (Bolzano), Italy

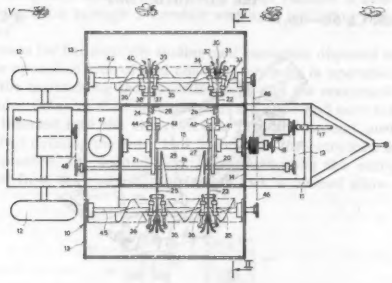
Filed Dec. 9, 1974, Ser. No. 530,860
Claims priority, application Italy, Dec. 11, 1973, 1732/73; Sept. 10, 1974, 83398/74
Int. Cl.² A01D *46/00*
U.S. Cl. 56—330 11 Claims

1. A machine for harvesting grape-berries from grape-bunches, without injury to the vine that produces the grapes, comprising;

a frame which can be moved along a row of vines and positioned adjacent selected ones of the vines;

clasping finger means on the frame, receptive during use of vine-branches manually removed from the vines and which bear grape-bunches, for mechanically releasably clasping the received vine-branches to support the grape-bunches, borne thereby, on the frame, whereas the clasping finger means are and remain detached from the vines themselves;

a mechanism on the frame for shaking the clasping finger means and thereby the vine-branches clasped by them to remove relatively ripe grape-berries from the grape-bunches supported on the frame and thereby to cause the removed grape-berries to fall from the so-supported grape-bunches to a lower location on the frame;



a grape-berry conveyor on the frame for collecting the fallen grape-berries and removing them from the lower location while the clasping finger means continue to clasp the resulting grape-stalks, subject to removal of the grape-stalks therefrom after the falling and collecting of the grape-berries; and

drive means on the frame for driving the shaking mechanism and the collecting conveyor;

whereby the vines are protected from injury caused by clasping and shaking, and the collecting of berries is limited to the relatively ripe grape-berries removed from the grape-bunches.

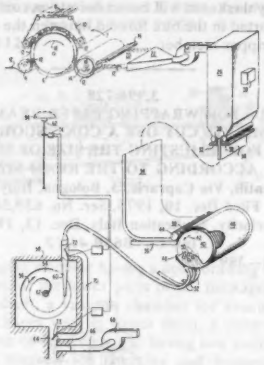
3,996,731

APPARATUS FOR CONVEYING AND BREAK SPINNING FIBERS

Ernest Koella, III, Rockford, Tenn., assignor to Rockford Manufacturing Company, Rockford, Tenn.

Filed Feb. 6, 1975, Ser. No. 547,619
Int. Cl.² D01H 1/12
U.S. Cl. 57—58.95 **8 Claims**

1. An apparatus for conveying and break spinning fibers comprising: opening means for separating a fiber bat essentially into individual fibers; feeding means operably associated with said opening means for feeding the fiber bat to said opening means; a plurality of conduits opening adjacent the peripheral surface of said opening means, each extending to a discrete location remote from said opening means; a vacuum manifold opening into said conduits and operable to draw fibers through the resultant suction from said peripheral surface of said opening means into and along the length of said conduits; and a plurality of break spinning means each connected to the respective conduits and remote from said opening means for spinning fibers conducted from said opening means ingo yarns, said opening means is comprised of an elongated. cylindrical opening roller operable to rotate about the longitudinal axis thereof; a housing at least partially surrounding said opening roller; a cylindrical feeding roller disposed tangentially adjacent said opening roller and operable to rotate about the longitudinal axis thereof to feed the fiber bat to said opening means, each of said plurality of conduits opens at one end to said opening roller with an orifice at a point adjacent the periphery of said opening roller, said orifices formed by said plurality of conduits overlap longitudinally thereof and the sum of the dimensions of the diameters



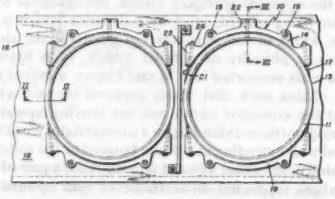
of said orifices measured parallel to the longitudinal axis of said opening roller is greater than the length of said opening roller.

3,996,732

SPINNING AND TWISTER RING ASSEMBLY

William A. Foster, Gastonia, N.C., assignor to Whitinsville Spinning Ring Company, Whitinsville, Mass.

Filed June 23, 1975, Ser. No. 589,013
Int. Cl.² D01H 7/64, 7/62
U.S. Cl. 57—122 **6 Claims**



1. Spinning and twisting ring assembly, comprising

a. a ring having an annular groove formed on its outer surface,

b. a bracket adapted to be fastened to a spinning or twister frame, the bracket being fastened to a horizontal surface and extending at least partly around the ring, and

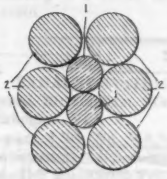
c. a rod having at least one end attached to the bracket and having its intermediate portion residing in the groove, wherein a second bracket engages the diametrically-opposite portion of the ring, and wherein the rod extends between the two brackets and lies in the groove on one side of the ring, while a second rod joins the brackets and lies in the groove on the other side of the ring.

3,996,733

REINFORCING CORD CONSTRUCTION

Barry B. Holmes, Miami Shores, Fla., assignor to Uniroyal Inc., New York, N.Y.

Filed Jan. 27, 1976, Ser. No. 652,673
Int. Cl.² D07B 1/06
U.S. Cl. 57—145 10 Claims



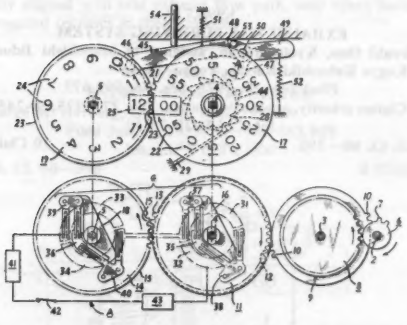
1. A metallic reinforcing cord structure suitable for reinforcing elastomeric articles comprising:
a core consisting of two equal diameter metallic wires; and
an outer layer consisting of six equal diameter metallic wires disposed about said core wires,
the diameter of said outer layer wires being generally between about 1.23 and about 1.43 times the diameter of the core wires.

3,996,734

MINUTE-INTERVAL ALARMING DEVICE FOR A CLOCK OR THE LIKE

Kiyoshi Kitai, Tokyo; Masuo Ogihara, Chiba; Kouzo Sato, Yotsukaido, and Nobuo Shinozaki, Chiba, all of Japan, assignors to Seiko Koki Kabushiki Kaisha, Japan

Filed Apr. 23, 1975, Ser. No. 570,776
Claims priority, application Japan, Apr. 26, 1974, 49-47947[U]
Int. Cl.² G04B 23/10; G04C 21/36
U.S. Cl. 58—38 R 7 Claims



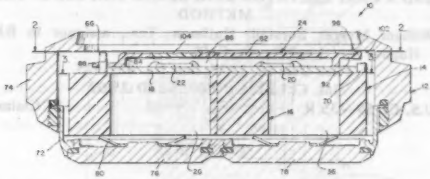
1. An alarming device for a clock and the like comprising: a rotatable minute time wheel; means for intermittently driving said minute time wheel through angular distances representing minutes; a rotatable 10-minute time wheel positioned to intermittently mesh with said minute time wheel so as to be intermittently driven thereby through angular distances representing 10 minutes, one of said minute and 10-minute time wheels having a plurality of angularly spaced apart shift teeth portions, separated by non-toothed portions, which intermittently mesh with a continuously toothed portion of the other wheel; a rotatable hour time wheel positioned to intermittently mesh with said 10-minute time wheel so as to be intermittently driven thereby through angular distances representing hours; first and second angularly adjustable detection devices for respectively detecting when the 10-minute and hour time wheels are in predetermined angular positions, said first detection device containing alarm time indicating indicia each of which represents one-figure minutes selected in accordance with the number of said shift teeth, and said second detection device containing alarm time indicating indicia representing hours; setting means for setting said detection devices in angular positions corresponding to a time at which it is desired that an alarm should be given; and audible alarm means rendered operative only when the 10-minute time wheel and the first detection device, and the hour time wheel and the second detection device, are in corresponding angular positions to provide an audible alarm.

3,996,735

ELECTRONIC WATCH CONSTRUCTION

Rudolf F. Zurcher, Newport Beach, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.

Filed Sept. 2, 1975, Ser. No. 609,259
Int. Cl.² G04B 19/30; G04C 3/00; G04B 37/00
U.S. Cl. 58—50 R 6 Claims



1. An electronic watch module for use in a watch case having a downwardly facing stop surface comprising:
a spacer block having an opening therein for the containment of a battery;
a substrate having a front and back and having its back positioned toward said spacer block for contact with a battery in the battery opening and having electronic components on the front of said substrate;
a cover positioned over at least part of said substrate for protection of at least part of the electronic components on the front of said substrate, a resilient web on said cover having a finger on said web for engagement with the stop surface in the watch case for positioning of said module within the watch case, said web being resilient so that said module is resiliently mounted in the watch case in a direction causing web deflection.

3,996,736

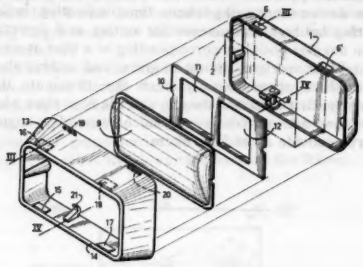
CLOCK OR CALENDAR WITH REMOVABLE CASING

Marie-Therese Bodet, La Marzello, 1 rue de l'Evre, 49 340 Trementines, France

Filed Aug. 25, 1975, Ser. No. 607,617
Claims priority, application France, Sept. 13, 1974, 74.31014
Int. Cl.² G04B 37/00
U.S. Cl. 58—53 6 Claims

1. Apparatus for indicating the passage of time, comprising a base, means for mounting the base on a wall, mechanism for operating a time change display, said mechanism being carried by said base on the side of said base opposite said wall, a cup-shaped cover enclosing said mechanism, said cover having a transparent front plate and a frame surrounding said

front plate and said base, means releasably securing the rear edge of said frame to said base, and an opaque mask carried



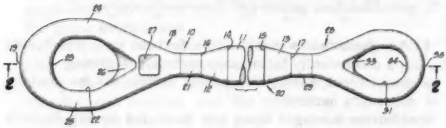
by said frame behind said transparent plate, said mask having openings therethrough for the display of time indicia.

3,996,737

METHOD OF MANUFACTURING ELEVATOR LINKS AND A CAST ELEVATOR LINK BLANK FOR USE IN THE METHOD

William Mercer Burstall, Huffman, Tex., assignor to BJ-Hughes Inc., Long Beach, Calif.

Filed Dec. 10, 1975, Ser. No. 639,525
Int. Cl.² B21L *17/00;* **B22D** *25/02*
U.S. Cl. 59—35 R **14 Claims**



1. A method of making a one-piece elevator link having a shank, a first eye at one end of the shank, and a second eye at the other end of the shank which comprises the steps of:

casting in a single piece from alloy steel an elevator link blank having a shank portion with a first eye at one end and a second eye at the other end, said eyes respectively having substantially the size and shape of the eyes desired in the finished elevator link; said shank portion having a diameter substantially greater than the diameter desired in the finished link and a length substantially less than the length desired in the shank of the finished link; and

hot working said shank portion to reduce its diameter and correspondingly elongate it until the distance between the inner distal points of said eyes is substantially that desired in the finished elevator link.

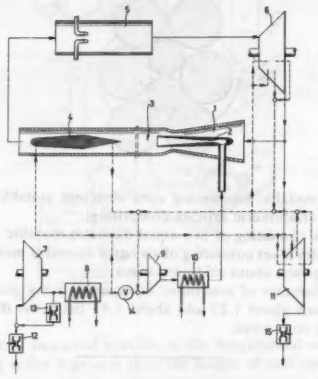
3,996,738

GAS TURBINE CIRCUIT SYSTEM

Siegfried Justus, An der Juch 76, 507 Bergisch-Gladbach, Germany

Filed Apr. 11, 1975, Ser. No. 558,351
Int. Cl.² F02C *7/02*
U.S. Cl. 60—39.16 R **1 Claim**

1. A gas turbine circuit system comprising, in combination, a heat source for heating the gas and having a gas inlet and a hot gas outlet, a first turbine having a hot gas inlet and a hot gas outlet, said first turbine inlet being connected to said heat source outlet, said first turbine outlet being connected to said heat source inlet via a gas feed back path, said first turbine providing a hot gas pressure drop of below 10 divided by 1, whereby more than 50% by weight of the hot gas having passed said first turbine is fed back to said heat source inlet, a second turbine having a hot gas inlet and a gas outlet, said second turbine hot gas inlet being connected to said first turbine outlet, said feed back path including: nozzle means fed from said first turbine outlet so to accelerate hot gas passing therethrough, gas mixing means for injecting into the hot gas, having passed said nozzle means, cold gas from compressing means, said cold gas having about the same static pressure and



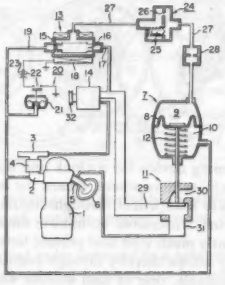
about the same flow velocity and direction as said hot gas from said nozzle already during injection, and recompressing means fed by a gas mixture from said gas mixing means, said recompressing means comprising an oblique shock supersonic compressing head and a diffusor, said gas mixing means comprising at least one Laval nozzle, whereby said gas feed back path provides a pressure increase, hot gas quantities discharged by said second turbine being replaced, in the circuit, by equivalent quantities of cold gas via said compressing means.

3,996,739

EXHAUST GAS PURIFYING SYSTEM

Hiroaki Ono, Kyoto, Japan, assignor to Mitsubishi Jidosha Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed July 28, 1975, Ser. No. 599,677
Claims priority, application Japan, Feb. 27, 1975, 50-24571
Int. Cl.² F02B *75/10*
U.S. Cl. 60—290 **10 Claims**



1. An exhaust gas purifying system comprising a diaphragm means having first and second pressure chambers defined by a diaphragm and operating a secondary air control valve therethrough, said first pressure chamber being supplied selectively with positive pressure or negative pressure while said second pressure chamber is supplied continuously with the negative pressure, a supply pressure changeover means for selectively

switching supply of the positive pressure generated by a secondary air supply source or the negative pressure in an intake manifold of an engine to said first pressure chamber of the diaphragm means, an operating mechanism for operating said supply pressure changeover means, and a delay means being located in a pressure communicating passage between said supply pressure changeover means and said first pressure chamber and consisting of a check valve and a restriction means parallel thereto.

3,996,740

EXHAUST SYSTEMS

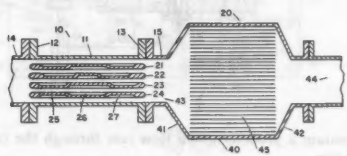
Leonard M. Niebylski, Birmingham, Mich., assignor to Ethyl Corporation, Richmond, Va.

Continuation-in-part of Ser. No. 368,741, June 11, 1973, which is a continuation-in-part of Ser. No. 343,105, March 20, 1973, abandoned. This application Feb. 19, 1975, Ser. No. 551,133

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 2, 1976

Int. Cl.² F01N *3/14*

U.S. Cl. 60—299 **9 Claims**



1. In an exhaust system for an internal combustion engine, said system comprising a catalytic reactor containing a catalyst bed, said catalytic reactor being operatively connected by exhaust conduit means to receive the exhaust gas from said internal combustion engine, the improvement which comprises a plurality of substantially parallel proximately spaced vanes located in the exhaust flow path between said engine and said catalyst bed, the surface of said vanes being substantially aligned with said exhaust flow path, said vanes having elongated recesses in their surface.

3,996,741

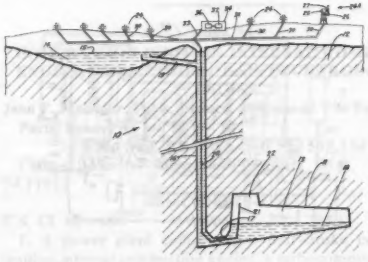
ENERGY STORAGE SYSTEM

George M. Herberg, Gonvick, Minn. 56644

Filed June 5, 1975, Ser. No. 583,968

Int. Cl.² F15B *21/00*

U.S. Cl. 60—398 **4 Claims**



1. An energy storage apparatus usable in conjunction with a natural water body, said apparatus comprising:

a compressed air storage cell located at the bottom of said water body and defining a closed chamber to hold a supply of air under pressure;

the lower portion of said cell having water ports opening to said chamber to permit passage of water between the chamber and the water body whereby water in the chamber exerts and maintains pressure upon air located in the chamber;

air inlet means to the chamber;

means to pump air into the chamber through the air inlet means against the pressure of water in the chamber and displace a portion of water from the chamber for storage of air under pressure;

said means to pump air including at least one air compressor and a machine of the type driven by a natural element to operate the air compressor, said machine being floatable on the surface of said water body; and

air outlet means to extract air under pressure from the chamber for the performance of a work function.

3,996,742

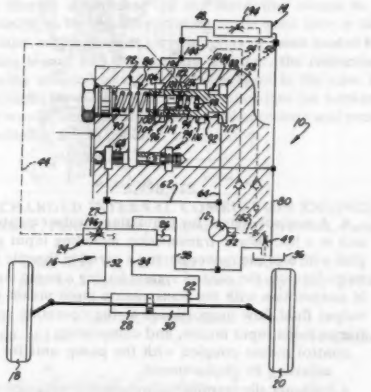
FLUID FLOW CONTROL APPARATUS

Raymon L. Goff, Lafayette, Ind., assignor to TRW Inc., Cleveland, Ohio

Filed Mar. 4, 1976, Ser. No. 663,768

Int. Cl.² F15B *11/20;* **F16H** *39/46*

U.S. Cl. 60—422 **20 Claims**



1. Fluid flow control apparatus for use in a vehicle having a power steering apparatus and an auxiliary apparatus which are to be supplied with fluid from the same pump, said fluid flow control apparatus comprising a housing having a valve chamber, a plurality of port means in said housing for connecting the pump, power steering apparatus and auxiliary apparatus in fluid communication with said valve chamber, first and second relatively movable valve members disposed in said valve chamber, said first valve member at least partially defining a first chamber section within said valve chamber and being movable relative to said housing between an open position enabling fluid to flow from the pump through said first chamber section and port means to the auxiliary apparatus and a closed position at least partially blocking fluid flow from the first chamber section through said port means to the auxiliary apparatus, said second valve member being movable relative to said housing and first valve member between an open position enabling fluid to flow from the pump through said port means to the auxiliary apparatus and a closed position at least partially blocking fluid flow from the pump to the auxiliary apparatus, said first and second valve members having surfaces which at least partially define a second chamber section within said valve chamber, and conduit means for conducting variations in fluid pressure to said first and second chamber sections to effect relative movement between said first and second valve members to their closed positions in response to demand by the power steering apparatus for fluid at a flow

rate which is at least as great as the fluid flow rate from the pump when said first and second valve members are in their open positions.

3,996,743

UNDERSPEED ACTUATOR WITH PART THROTTLE CONTROL

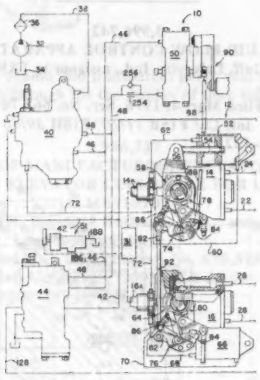
Cyril W. Habiger, and William J. Spivey, both of Joliet, Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Feb. 20, 1975, Ser. No. 551,809

Disclosure was also published under second Trial Voluntary Protest Program on Feb. 24, 1976

Int. Cl.² F16H *39/46*

U.S. Cl. 60—431 **8 Claims**



1. A control system for regulating displacement of a pump unit in a hydrostatic transmission including input means coupled with a prime mover having a variable throttle setting and output means, the control system having a pump means driven in conjunction with the transmission input means to produce output fluid flow proportional to the operating speed of the transmission input means, and comprising

control means coupled with the pump unit for selectively adjusting its displacement,

a hydraulically responsive underspeed actuator operatively coupled with the control means in order to vary the amount of actual change in pump displacement relative to movement of the control means, and

signal means for receiving output fluid flow from the pump means and communicating a variable fluid signal to which the underspeed actuator is responsive, and

part throttle control means coupled with the prime mover and responsive to a reduced throttle setting for the prime mover to condition the underspeed actuator for maintaining an increased displacement setting of the pump means and thereby establishing more efficient transmission operation.

3,996,744

AUTOMATIC CONTROL FOR HYDRAULIC POWER TRANSMISSION

William A. Ridge, Inman, Kans., assignor to The Cessna Aircraft Company, Wichita, Kans.

Filed Sept. 2, 1975, Ser. No. 609,778

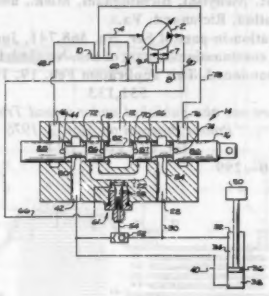
Int. Cl.² F16H *39/46*

U.S. Cl. 60—445 **6 Claims**

1. In a fluid energy transmission system which includes a driven variable displacement pump, a movable element for varying the displacement of the pump, a servo means having a piston operably connected to move the movable element to vary the pump displacement in response to different pressures and a pair of conduit means interconnecting the pump to a control valve and thence to a motor in a driving, recirculating relation, an improved control for such system comprising:

a flow-to-pressure transducer means which incorporates a flow restriction interposed in the control valve capable of generating a pressure differential upstream and downstream of the restriction which is proportional to the flow through the conduit means;

a first sensing line affording communication between the servo and the control valve at a point downstream of the flow restriction whereby the pressure actuates the servo piston to increase or decrease pump displacement to



maintain a predetermined flow rate through the conduit means;

a bleed orifice venting the first sensing line to atmosphere;

a valve means in the first sensing line having a first position unrestricting flow in the first sensing line and a second position blocking flow in the first sensing line; said valve means including an actuating piston connected through a second sensing line to said motor whereby when a certain static load is experienced on said motor, the actuating piston actuates the valve means moving it to its second position blocking flow in the first sensing line causing the pump to stroke back to a standby condition.

3,996,745

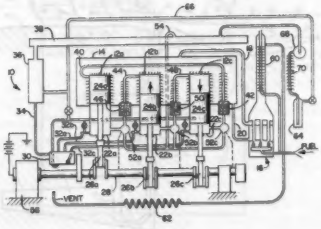
STIRLING CYCLE TYPE ENGINE AND METHOD OF OPERATION

John Gordon Davoud, and Jerry Allen Burke, both of Richmond, Va., assignors to D-Cycle Associates, Richmond, Va.

Filed July 15, 1975, Ser. No. 596,165

Int. Cl.² F02G *1/04*

U.S. Cl. 60—517 **7 Claims**



1. A method of operating a Stirling cycle type engine comprising the steps:

A. directing a heated heat exchange fluid externally about the hot end of a cylinder of a Stirling cycle type engine and in indirect heat exchange with a condensible working fluid;

B. directing the heated vapor of the working fluid from the hot cylinder through a heat exchanger;

C. condensing a portion of the vapor after it has passed through the heat exchanger;

D. directing the remaining portion of the vapor to the cold cylinder space of the Stirling cycle type engine; and

E. before and during compression of the vapor in the cold cylinder space injecting a liquid of the working fluid in an amount equal to, greater than or less than the portion condensed in step C.

3,996,746

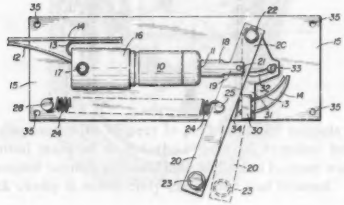
THERMAL MOTOR WITH MECHANISM FOR CONVERTING PISTON STROKE TO LONGER STROKE

Marvin A. Staschke, Glendora, Calif., assignor to Thermal Hydraulics Corporation, Glendora, Calif.

Filed June 9, 1975, Ser. No. 584,923

Int. Cl.² F03G *7/06*

U.S. Cl. 60—528 **6 Claims**



1. A thermal motor having a relatively short piston shaft stroke in combination with mechanism for converting the stroke to a longer stroke without prolonging the required motor actuation time, comprising

a. a thermal motor having a housing and an axially movable piston shaft,

b. a base plate on which the motor housing is pivotally mounted,

c. a crank arm pivotally mounted at one end on the base and pivotally connected between its ends to the motor shaft, said arm having a fitting on its opposite end for connection to an object to be actuated by the arm,

d. a limit switch and mounting plate mounted on the base in position providing contact between the crank arm and limit switch and deactivating the motor, the position of the switch relatively to the crank arm being adjustable, and

e. means returning the crank arm to rest position.

3,996,747

COMPRESSION-IGNITION INTERNAL COMBUSTION ENGINE AND METHOD OF SUPERCHARGING SUCH ENGINE

Jean F. Melchior, Paris, France, assignor to The French State, Paris, France

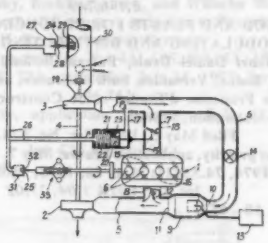
Filed Mar. 28, 1975, Ser. No. 563,134

Claims priority, application France, Mar. 29, 1974, 74.11012

Int. Cl.² F02B *33/44*

U.S. Cl. 60—606 **39 Claims**

1. A power plant comprising a four-stroke compression ignition internal combustion engine; a turbocompressor set for supercharging the engine and comprising a compressor, a turbine driving the same, and a passage communicating with the compressor outlet and the turbine inlet and serving to return to the turbine all that part of the compressor delivery which does not pass through the engine, the engine comprising a variable-volume working chamber so communicating via an inlet duct with the compressor outlet and via an exhaust duct with the passage as to be in parallel with some of the passage; and means for heating the gases entering the turbine, such means comprising an air inlet and a gas outlet, which outlet is connected to the passage upstream of that part thereof to which the exhaust duct extends; in which power plant the inlet duct and the exhaust duct have distributing means adapted to open them simultaneously during at least part of each transfer phase, such part being, with advantage, near the end of the exhaust phase and the beginning of the inlet phase; and re-



stricting means are provided in the inlet duct to reduce the pressure therein downstream of the restricting means to a value, relative to the pressure existing at the same time in the exhaust duct, which permits a cyclic reflux of gases heated by the heating means into the working chamber, the restricting means being adapted to come into operation in the case in which, without the cyclic reflux, the air taken into the working chamber would, because of inadequate temperature and pressure conditions, fail to produce self-ignition.

3,996,748

SUPERCHARGED INTERNAL COMBUSTION ENGINES

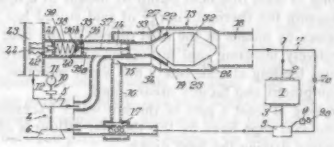
Jean Melchior, Paris, France, assignor to Etat Francais, Paris, France

Filed May 13, 1975, Ser. No. 577,039

Claims priority, application France, May 15, 1974, 74.16756

Int. Cl.² F02G *3/00*

U.S. Cl. 60—614 **16 Claims**



1. A power unit comprising:

an internal combustion engine having variable volume combustion chambers,

a turbocompressor supercharging unit having a compressor and a turbine, the inlet of said turbine being connected to receive the exhaust gas of said engine,

continuously open bypass conduit means having an inlet and an outlet connected to flow the air delivered by said compressor and not drawn by the engine to the inlet of said turbine with a pressure loss which, if appreciable, is substantially independent of the ratio of the flow rate traversing said bypass conduit means to the air flow delivered by the compressor,

an auxiliary combustion chamber connected to the outlet of said bypass conduit means and to the exhaust of said engine and having an output connected to the inlet of said turbine,

ejector-diffuser means having a driving gas inlet connected to the outlet of said compressor to receive the total air flow from said compressor, a driven gas inlet and an

outlet connected to the intake of said engine and to the inlet of said bypass conduit means,

branch pipe means connected between the outlet of said auxiliary combustion chamber and said driven gas inlet of said ejector-diffuser means,

and means for adjusting the ratio between a cross-sectional area on the driven gas flow path and a cross-sectional area in said branch pipe means.

3,996,749

METHOD AND PLANTS FOR PRODUCING, STORING, MODULATING AND DISTRIBUTING ENERGY

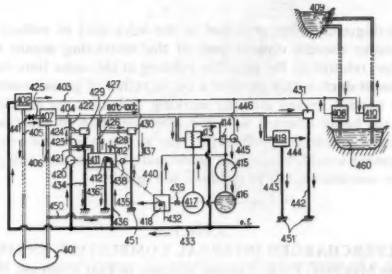
Louis Henri Daniel Denis, Puteaux-Bellini, and Abel Jean Henri Bedué, Versailles, both of France, assignors to Compagnie Francaise d'Etudes et de Construction "Technip", Rueil-Malmaison, France

Filed May 5, 1975, Ser. No. 574,418

Claims priority, application France, May 7, 1974, 74.15674; Oct. 8, 1974, 74.33821; Mar. 28, 1975, 75.09935

Int. Cl.² F01K *1/04, 27/02*

U.S. Cl. 60—652 **17 Claims**



1. A method of producing, storing, modulating and distributing energy, comprising:

storing in storage areas of large capacities hot water excesses produced at least during some working periods by thermal-type electric power generating plants;

driving at least one heat pump by means of a heat engine;

increasing the thermal energy of said stored hot water excesses by means of the heat output of the heat pump;

selectively injecting said hot water excesses through pipelines feeding at least one a hot water injection, recovery equipment and facility means; and

reheating at least a part of the hot water excesses injected into said pipe-lines by the thermal effluents of the heat engine driving the heat pump.

3,996,750

FLAT THROTTLING GATE

Anton Brcar, Ljubljana, Yugoslavia, assignor to Titovi Zavodi Litostroj Ljubljana n.sol.o., Ljubljana, Yugoslavia

Filed Nov. 13, 1975, Ser. No. 631,617

Claims priority, application Yugoslavia, Nov. 14, 1974, 3040/74

Int. Cl.² E02B *7/30*

U.S. Cl. 61—28 **5 Claims**

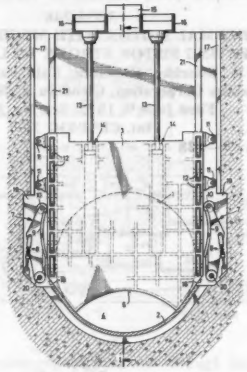
1. A throttling gate for throttling the flow of water in the draft tube of a water turbine, comprising:

a flat valve body displaceable transversely to the draft tube toward and away from a wall thereof, said draft tube being formed with a guide slot for said body;

guiding and supporting rolls movably mounting said body for displacement thereof transversely to the axis of said tube in said slot;

means defining a pair of chambers flanking said body in a fully inserted position thereof in said slot, said body being provided with symmetrical ramps on opposite edges thereof and with a cutout intermediate said ramps defining an arcuate throttling edge;

respective swings pivotally mounted in said chambers for swinging movement about respective axes parallel to the axis of said draft tube and perpendicular to the direction of displacement of said body, said swings being formed at free ends thereof with respective masks conforming to the contours of said draft tube and defining a smooth annular



contour with said wall of said draft tube, and the edge of said cutout;

respective control rollers on said swings engageable by said ramps and displaceable by said ramps outwardly into a fully recessed position within the respective chamber upon advance of said body toward said well of said draft tube; and

respective actuating mechanisms biasing said swings toward said body and said control rollers into engagement with said ramps.

3,996,751

METHOD OF BLASTING AND REINFORCING ROCK CAVITIES

Tore Jerker Hallenius, Esplanaden 23, 852 32 Sundsvall, and Karl Ivar Sagefors, Svetsarvagen 5, 175 73 Jarfalla, both of Sweden

Filed May 29, 1974, Ser. No. 474,221

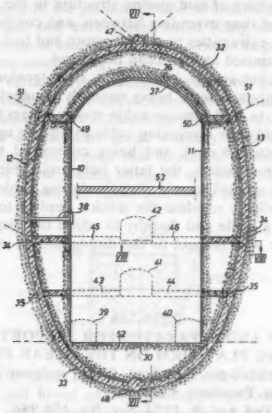
Claims priority, application Sweden, July 30, 1973, 7310504; May 16, 1974, 7406572

Int. Cl.² E01G *1/00;* **E21D** *11/00*

U.S. Cl. 61—42 **9 Claims**

1. A method of forming a reinforced rock cavity comprising the steps of: predetermining the location of a future rock cavity of preplanned length, width and depth dimensions and having top, bottom and opposite side walls; driving access tunnel means to the vicinity of said planned reinforced rock cavity, cutting out in the rock outside of and spaced longitudinally from at least the preplanned side walls and bottom wall a plurality of arcuated tunnels from said access tunnel means; filling said arcuated tunnels with a reinforcing material; forming top wall reinforcing means which includes a reinforcing material and which extends between upper ends of the arcuated tunnels outside of the side walls and bottom walls whereby, in vertical cross-section, the arcuated tunnels and top wall reinforcing means lying in the same vertical plane form a completely closed continuous loop which entirely encircles and reinforces the preplanned rock cavity; and excavating rock disposed within the planned outline of the rock cavity; said steps of cutting out said arcuated tunnels, filling

them with reinforcing material and forming said top wall reinforcing means being carried out before the rock cavity is completely excavated up to the side walls of the rock cavity, at least said side walls and bottom walls being spaced from and



so disposed with respect to said arcuated tunnels that a substantial mass of undisturbed material remains between said arcuated tunnels and said side walls and bottom wall after said rock cavity is completely excavated and formed.

3,996,752

CASING PANEL

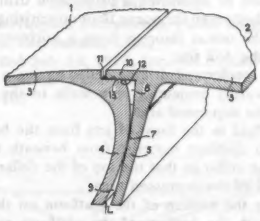
Jacques Oger, Pont-a-Mousson, France, assignor to Pont-A-Mousson S.A., Nancy, France

Filed Mar. 19, 1975, Ser. No. 560,014

Claims priority, application France, Mar. 22, 1974, 74.10003

Int. Cl.² E21D *11/14*

U.S. Cl. 61—45 R **5 Claims**



1. A panel for the construction of a cylindrical casing and comprising an assembly of identical juxtaposed voussoirs each comprising a part-cylindrical four-sided web and four juxtaposition walls which are interconnected and substantially perpendicular to the web, opposite walls of said four walls having outer surfaces comprising a first surface portion and a second surface portion which surface portions extend throughout the length of the corresponding wall, the first surface portions of said opposite walls being mismatching surface portions which do not marry up radially of the web and define therebetween, when the surfaces of said opposite walls pertaining to two adjacent voussoirs in the panel are put in contact with each other in their correct mutual positions in the panel, a cavity extending throughout the length of the corresponding walls for receiving a filling material while said second surface portions define therebetween in a region between said cavity and an outer surface of the webs of the adjacent voussoirs remote from the walls, overlapping bearing surfaces which extend substantially parallel to the direction of the web throughout the length of the corresponding walls and are in mutual bearing relation radially of the web and close off communication between the cavity and said outer surface of the webs.

3,996,753

MINE ROOF SUPPORT

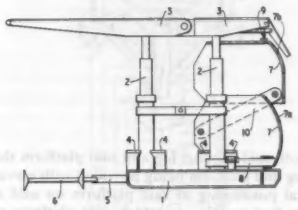
Walter Lubojatsky, Recklinghausen, and Wilhelm Wertelewski, Datteln, both of Germany, assignors to Becorit Grubenausbau GmbH, Recklinghausen, Germany

Continuation-in-part of Ser. No. 441,485, Feb. 11, 1974, Pat. No. 3,908,389. This application July 15, 1975, Ser. No. 596,161

Claims priority, application Germany, Feb. 27, 1973, 2309670

Int. Cl.² E21D *15/44*

U.S. Cl. 61—45 D **8 Claims**



1. A mine roof support, for use at a mineral face, comprising a base member, extensible props means mounted on said base member, a roof-engaging structure mounted on said prop means for application thereby to a roof to be supported, a multi-part flushing screen shield including upper and lower parts arranged on the goaf side of the support, first hinge means mutually connecting the parts of said screening shield and having a flexible member connecting the upper part of the shield and the roof-engaging structure and which permits movements of the upper part of the shield about an axis lying transversely to the longitudinal direction of the mineral face, and second hinge means connecting the lower part of the shield with the base member and having a hinge axis which lies transversely to the longitudinal direction of the mineral face, whereby the screening shield is pivotally movable with respect to the support not only towards and away from the mineral face but also parallel thereto, and prop aligning means, including a cylinder incorporating aligning force producing means, arranged between props of the support on the one hand and the base member or parts connected with the base member on the other hand and which aligning means also serve for swivelling of the flushing screen shield about the hinge means between the base member and the lower part of the flushing screen shield.

3,996,754

MOBILE MARINE DRILLING UNIT

Edwin L. Lowery, Houston, Tex., assignor to Engineering Technology Analysts, Inc., Houston, Tex.

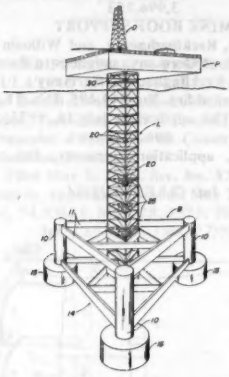
Filed Dec. 14, 1973, Ser. No. 424,838

Int. Cl.² E02B *17/00*

U.S. Cl. 61—92 **5 Claims**

1. A mobile drilling unit for use in a body of water comprising: a floatable base; a floatable platform; and a single vertical support leg attached to said base and extending upwardly through a well centrally provided therefor in said platform; said floatable base comprising a plurality of vertical columns surrounding the bottom of said support leg and connected to each other and said support leg by interconnecting structural

members to form a substantially horizontal frame, each of said columns being hollow so as to render said base buoyant, means for introducing and removing ballast to and from said columns for positioning said floatable base between a floating position at the surface of said water body and a submerged position on the floor of said body of water, said base, when in said floating position, being of a sufficient buoyancy for supporting both said support leg and said platform thereon; said support leg and platform being provided with elevating means for vertical positioning of said platform on said support leg between a first position in which said platform rests and is supported on said base frame, when said base is in its floating position, and a second position in which said platform is elevated above said body of water, with said base in its submerged position.

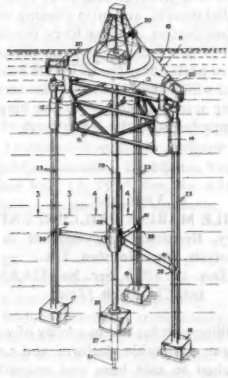


3,996,755

TENSION LEG STRUCTURE WITH RISER STABILIZATION

David W. Kalinowski, Metairie, La., assignor to Texaco Exploration Canada Ltd., Calgary, Canada

Filed July 10, 1975, Ser. No. 594,922
Int. Cl.² E02B 17/00
U.S. Cl. 61—86 **5 Claims**



1. In a tension leg marine structure for an offshore body of water including a buoyant structure having a working deck, means to apply a buoyant force to the structure whereby to controllably regulate the floating disposition thereof in a body of water, anchor means at the floor of said body of water, tension cable means extending between said anchor means and said structure respectively, said tension cable means being adjustable by applying tension thereto for establishing the floating disposition of said marine structure in the water,

an elongated riser extending between, and connected at its repective extremities to said structure and to a connector means disposed at the ocean floor, and

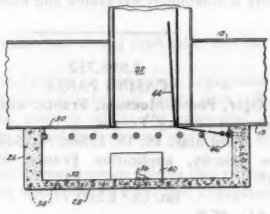
a riser bracing system including; a riser tensioning cable having opposed ends, being operably connected to said riser and to said tension cable means respectively, one end of said riser tensioning cable extending upwardly to said structure's deck and being connected to a cable take-up mechanism, the latter being operable to adjust the force applied to said riser tensioning cable, whereby to controllably regulate the tension applied to said riser tensioning cable and thereby to adjust the disposition of said riser with respect to the disposition of said tension cable.

3,996,756

METHOD AND APPARATUS FOR SUPPORTING A DRILLING PLATFORM ON THE OCEAN FLOOR

Joseph F. Schirtzinger, Pasadena, Calif., assignor to Sea-Log Corporation, Pasadena, Calif.

Filed Apr. 8, 1974, Ser. No. 458,986
Int. Cl.² E02B 17/00; E21B 7/12
U.S. Cl. 61—88 **3 Claims**



1. A method of anchoring a production drilling platform having a flat bottom to the ocean floor comprising the steps of:

dredging the ocean floor to form a horizontal depressed area at the drill site;

lowering a preformed drilling cellar having a bottom wall and upwardly projecting side walls to the ocean floor within the depressed area;

pumping fluid in the form of jets from the bottom of the cellar to displace material from beneath the cellar to lower the cellar so that the top of the cellar is flush with the level of the depressed area;

positioning the bottom of the platform on the top of the cellar with the bottom of the platform resting on the surrounding depressed area surface to close off the top of the cellar, adjustably securing the platform to the cellar, and sliding the bottom of the platform horizontally across the top of the cellar to adjust the position of the platform relative to the cellar.

3,996,757

APPARATUS FOR PROTECTING METALLIC STRUCTURAL ELEMENTS AGAINST CORROSION

Orval E. Liddell, P.O. Box 1533, Avalon, Calif. 90704

Continuation of Ser. No. 310,831, Nov. 30, 1972, abandoned, Continuation of Ser. No. 103,432, Jan. 4, 1971, abandoned.
This application July 22, 1974, Ser. No. 490,316
Int. Cl.² E02D 5/60
U.S. Cl. 61—54 **4 Claims**

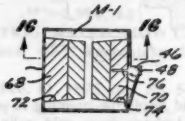
1. Apparatus for protectively encasing an installed metallic

columnar structural element against corrosion from water, air or a combination of water and air, comprising:

a generally rectangular, synthetic plastic, pliable water and airtight encasement sheet of a length at least as great as the length of the portion of said structural element to be protected, said encasement sheet being wrapped about the portion of said structural element to be protected with its edges overlapping;

a pair of vertically extending, abutting pole pieces secured to the edges of said encasement sheet in a rolledtogether water and airtight relationship with respect to the edges of said encasement sheet whereby said sheet is held against said portion of said structural element;

upper and lower sealing bands of compressible foam interposed between the upper and lower portions of said en-



casement sheet and said structural element with the upper and lower ends of said pole pieces terminating below and above said upper and lower sealing bands, respectively; and

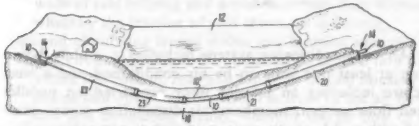
upper and lower wrapping bands extending around the upper and lower portions of said encasement sheet and said pole pieces to compress said sealing bands into a water and air sealing relationship with the upper and lower ends of said encasement sheet, said wrapping bands also retaining said encasement sheet and said pole pieces firmly upon said structural element, with said sealing bands and rolledtogether pole pieces cooperating with said encasement sheet to prevent the entry of air and water into the space between said sheet and the portion of said structural element to be protected.

3,996,758

METHOD FOR PLACEMENT OF PRODUCTION CASING UNDER OBSTACLE

Martin D. Cherrington, Sacramento, Calif., assignor to Tidril Corporation, Sacramento, Calif.

Filed July 14, 1975, Ser. No. 595,829
Int. Cl.² F16L 1/02; E02D 29/00
U.S. Cl. 61—105 **13 Claims**



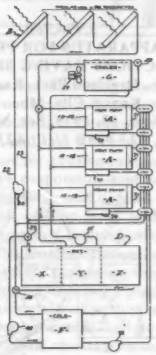
1. A method of installing a tubular production casing in ground having frictional resistance to the advancement of a casing through the ground, said tubular production casing extending beneath and spanning an obstacle such as a river along the inverted underground arcuate path of a pilot hole occupied by a drill string underlying the obstacle and spanning the obstacle from a first position at or near ground level on a side of said obstacle to a second position at or near ground level on the opposite side thereof, said production casing having an inner diameter greater than the diameter of the drill string and an outer diameter, said method comprising the steps of advancing a tubular oversized casing into the pilot hole from one side of the obstacle and partially along said pilot hole until advancing said oversized casing along the path of the pilot hole is substantially impeded by friction between said oversized casing and encountered ground, the inner diameter of said oversized casing being greater than the outer diameter of the production casing; and advancing the production casing from said one side of the obstacle through the interior of the oversized casing along the extent of the path of the pilot hole occupied by the oversized casing and along the remainder of the path of the pilot hole to the other side of the obstacle so that the production casing is installed beneath and spanning the obstacle.

3,996,759

ENVIRONMENT ASSISTED HYDRONIC HEAT PUMP SYSTEM

Milton Meckler, 16348 Tupper St., Sepulveda, Calif. 91343

Filed Nov. 3, 1975, Ser. No. 627,851
Int. Cl.² F25B 27/00
U.S. Cl. 62—2 **23 Claims**



1. A solar insolation assisted air conditioning system wherein at least one water source mechanical refrigeration heat pump is operable to condition and to discharge return air from and into a zone to be air conditioned, and including; heat exchange means for the collection of solar heat into a first liquid heat transfer media, a stratified thermal mass having high heat range to low heat range sections, there being a heat transfer and pump means directing the said first liquid heat transfer media from the heat exchange means into the high heat range section of said stratified thermal mass and therethrough returning the said first liquid heat transfer media to the heat exchange means from the low heat range section of said stratified thermal mass, and there being a water source heat transfer means directing a second liquid heat transfer media through an intermediate moderate heat range section of said stratified thermal mass and through a heat energy exchanging coil of the said water source mechanical refrigeration heat pump.

11. A solar insolation and re-radiation assisted air conditioning system wherein at least one water source mechanical refrigeration heat pump is operable to condition and to discharge return air from and into a zone to be air conditioned, and including; heat exchange means for the collection of solar heat into a first liquid heat transfer media, a primary stratified thermal mass having high heat range to low heat range sections, a secondary thermal mass, there being a hot fluid transfer and pump means directing the first liquid heat transfer media from the heat exchange means into the high heat range section of said primary stratified thermal mass and therethrough retaining the said first liquid heat transfer media to the heat exchange means from the low heat range section of said stratified thermal mass, differential control means re-

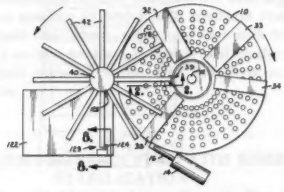
stricting operation of the hot fluid transfer and pump means within a determined heat range of said first liquid heat transfer media, there being a cold fluid transfer and pump means directing the first liquid heat transfer media from the heat exchange means into said secondary thermal mass and therethrough returning the said first liquid heat transfer media to the heat exchange means, differential control means restricting operation of the cold fluid transfer and pump means within a determined cold range of said first liquid heat transfer media, there being a water source heat transfer and pump means directing a second liquid heat transfer media through an intermediate moderate heat range section of said primary stratified thermal mass and through a heat energy exchanging coil of the said water source mechanical refrigeration heat pump, there being a cooled fluid transfer and pump means directing a third liquid heat transfer media through said secondary thermal mass and through heat energy exchanging coils in the air flow through the said heat pump, and control means restricting operation of the last mentioned cooled fluid transfer and pump means to circulate said liquid on demand.

3,996,760

METHOD AND APPARATUS FOR PRODUCING FROZEN CONFECTIONS HAVING SPIRAL FINS

Sydney L. Bair, Jr., Overland Park, Kans., assignor to Merritt Foods Company, Kansas City, Mo.

Filed Sept. 15, 1975, Ser. No. 613,210
Int. Cl.[2] F25B *1/10;* **A23G** *9/00*
U.S. Cl. 62—73 **9 Claims**



1. A method for producing a stick frozen confection having uniformly spiraled longitudinal fins, said method comprising the steps of:

providing a mold having a cavity contoured complementary to the shape of the frozen confection and including a plurality of uniformly spiraled grooves for forming the fins of the frozen confections;

inserting fluid ingredients of the frozen confection into said mold;

inserting a stick member into said mold to project vertically therefrom;

freezing solidly the ingredients to form the frozen confection with the stick embedded therein;

defrosting said mold to melt the interface of the frozen confection and mold cavity;

gripping the stick projecting from said mold;

raising vertically the frozen confection from said mold while simultaneously rotating the frozen confection at a uniform rate whereby the fins of the frozen confection follow said spiraled grooves of the mold cavity as the frozen confection is withdrawn.

3,996,761

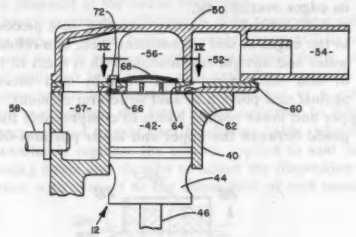
RECIPROCATING COMPRESSOR

Hubert Richardson, Jr., Kirkville, N.Y., assignor to Carrier Corporation, Syracuse, N.Y.

Filed Dec. 30, 1975, Ser. No. 645,162
Int. Cl.[2] F04B *49/02;* **F25B** *31/00*
U.S. Cl. 62—196 C **3 Claims**

1. In a reciprocating compressor operable to provide a relatively high pressure gas and including a cylinder having a reciprocally movable piston disposed therein, and a valve plate mounting a discharge valve to control the flow of the compressed fluid through an opening formed in the valve plate, wherein the improvement comprises:

said discharge valve being formed from a bimetallic element and being mounted in a normally open position with



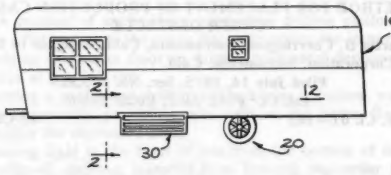
respect to said discharge opening in said valve plate to permit fluid leakage from said cylinder through said opening upon startup of said compressor, said discharge valve warping to a closed position relative to said opening as the temperature of the fluid increases due to the compression thereof by movement of said piston in said cylinder.

3,996,762

AIR CONDITIONING SYSTEM FOR A MOBILE HOME INCLUDING COMPONENT AREA ACCESS

Edward E. Calme, Fern Creek, and Wallace Shakun, Prospect, both of Ky., assignors to General Electric Company, Louisville, Ky.

Filed Feb. 18, 1975, Ser. No. 550,206
Int. Cl.[2] F25D *19/00*
U.S. Cl. 62—237 **7 Claims**



1. An air conditioning system including a mobile home having at least one zone to be air conditioned and a base structure including an interior floor supported on parallel spaced floor support members, air distribution means associated with said base structure, said system comprising:

an air conditioning unit being adapted to be removably attached to said mobile home including a cabinet having air moving means, a barrier dividing said cabinet into indoor and outdoor sections, an air delivery outlet communicating with said indoor section, an air return outlet dimensioned for communication with a portion of said indoor section and a portion of said outdoor section adjacent said barrier, a service area in said outdoor section and a control box in said indoor section aligned with said air return outlet;

said air distribution means including at least one air inlet for receiving air from said air conditioning unit and an air outlet for delivering air into said mobile home zone;

mounting means attached to said base structure for removably receiving said air conditioning unit including a first opening aligned with said air conditioning air delivery

outlet and a second opening in alignment with said unit's air return outlet when said unit is located in said mounting means;

air communicating means including a first passageway connecting said first opening with said air distribution air inlet and a second passageway for connecting said second opening to an opening in said interior floor; and

said second passageway encompassing said second opening and extending axially therefrom past adjacent floor support members and terminating with its free peripheral end being positioned in said interior floor opening for providing access from said mobile home interior to said service area in the outdoor section of said cabinet and said control box in the indoor section of said cabinet

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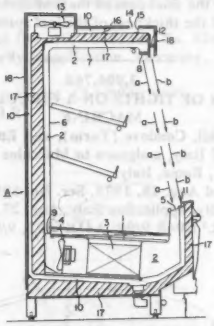
3,996,763
REFRIGERATED SHOW CASE

Masashi Karashima, 40-7, Sangenjaya 2-chome, Setagaya, Tokyo, Japan

Filed Feb. 11, 1975, Ser. No. 549,039
Claims priority, application Japan, Dec. 20, 1974, 49-145775
Int. Cl.² A47F *3/04*
U.S. Cl. 62—256 **2 Claims**



1. A refrigerated showcase comprising:

an upright showcase housing having an open front access thereinto and an opening in the top thereof;

first circulating means within said housing for cooling and circulating a flow of air within the bottom, rear and top walls of said housing and across said open front thereinto, whereby the interior of said showcase is cooled;

second circulating means within said housing adjacent said first circulating means for circulating a second flow of air within the bottom, rear and top walls of said housing and across said open front thereinto in front of the air flow of said first circulating means, whereby the air flow of said first circulating means is prohibited from contacting the ambient air outside the front of said housing, said second circulating means further being connected to said opening in the top of said housing; and

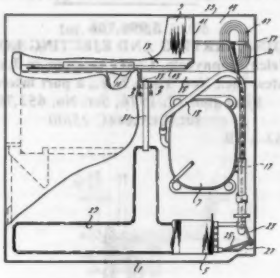
diversion means within said second circulating means at the top of said housing for diverting a portion of the air circulating in said second circulation means upward and outward through said opening in the top of said housing, and for limiting the flow of air through said second circulation means, said diversion means being comprised of:

a perforated baffle plate fitted within said second circulation means beneath said opening in the top of said housing, said baffle deflecting a portion of the air flowing through said second circulation means outward through said opening and limiting the flow of air in the second circulation means through the perforations therein.

3,996,764
REFRIGERANT COOLING APPARATUS

Richard W. Gilmer, Lewisburg, and Sanford R. Sexton, Dayton, both of Ohio, assignors to Fedders Corporation, Edison, N.J.

Filed Mar. 24, 1975, Ser. No. 561,408
Int. Cl.² F25B *47/00*
U.S. Cl. 62—279 **2 Claims**

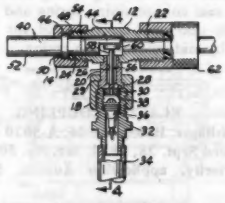


1. Refrigeration apparatus including a housing, an evaporator, a compressor, a condenser coil, and conduit means connecting said evaporator to said compressor, said compressor to said condenser coil, and said condenser coil to said evaporator, subcooling means for cooling refrigerant passing from said condenser to said evaporator, said sub-cooling means including a sub-cooling coil in said conduit means, means for facilitating the removal of heat from said sub-cooling coil including means for forming a reservoir around said coil and means for delivering condensate from said evaporator coil to said reservoir, and means for preventing the depth of condensate in said reservoir from exceeding a predetermined depth, said last means comprising a wall portion adjacent said condenser coil, and an opening in said wall portion for allowing condensate to flow from said reservoir to said condenser coil.

3,996,765
REFRIGERANT SYSTEM CHARGING AND EVACUATING MANIFOLD

John W. Mullins, P.O. Box 20524, Oklahoma City, Okla. 73120

Continuation-in-part of Ser. No. 518,822, Oct. 29, 1974, Pat. No. 3,916,641. This application Oct. 6, 1975, Ser. No. 620,087
Int. Cl.² F25D *45/00*
U.S. Cl. 62—292 **4 Claims**



1. A manifold for evacuating and charging a closed refrigerant system with fluid, said refrigerant system having a refrigerant line provided with an access fitting containing a normally closed valve which must be depressed to open, comprising:

a body having a thorough bore and having a lateral bore intersecting the through bore,

the lateral bore and one end portion of the through bore forming a fluid passageway;

access valve connector means connecting the lateral bore with said access fitting;

other connector means adapted to connect one end of a charging-evacuating hose with said one end portion of the through bore;

cam shaft means having an end portion disposed within the other end portion of the through bore; and,

plunger means interposed between said access valve and said cam shaft means within the lateral bore.

3,996,766

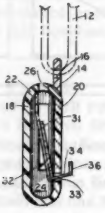
COIN-CARRYING AND EJECTING LOCKET

Velma Welch, Sunnyvale, Calif., assignor to Lawrence Peska Associates, Inc., New York, N.Y., a part interest

Filed Jan. 27, 1976, Ser. No. 652,787

Int. Cl.² A44C *25/00*

U.S. Cl. 63—1 R **5 Claims**



1. A coin-carrying locket comprising:

front and back walls and a peripherally extending wall connected therebetween to form a coin receiving and storage compartment;

a coin-receiving and a coin-ejection slot formed in spaced relation in said peripherally extending wall;

a first coin-ejection spring mounted within said compartment adapted to engage a coin stored therein and urge said coin towards said ejection slot for discharge therethrough;

a second coin-retaining spring pivotally mounted within said compartment adapted to engage a coin engaged by said coin-ejection spring and to urge the coin out of alignment with said coin-ejection slot to thereby prevent ejection of the coin through said ejection slot, said coin-retaining spring being provided at the free end thereof with a manually operable tab;

and a third slot formed in one of said walls dimensioned of permit said tab to extend therethrough and be shiftable therein, whereby manual shifting of said tab against the bias of said coin-retaining spring effects pivotal movement of said coin-retaining spring and alignment of the coin with said coin-ejection slot for discharge therethrough by said coin-ejection spring.

3,996,767

ELASTIC COUPLING

Leonhard Geislinger, Hofelgasse 26, A-5020 Salzburg, Austria

Filed Sept. 25, 1974, Ser. No. 509,043

Claims priority, application Austria, Sept. 25, 1973, 8254/73

Disclosure was also published under second Trial Voluntary Protest Program on Feb. 24, 1976

Int. Cl.² F16D *3/14*

U.S. Cl. 64—27 L **6 Claims**

1. An elastic coupling for transmitting torque from a driving element rotating about an axis to a driven element and for damping torsional vibrations, the coupling comprising

1. a hub connected to one of the elements,

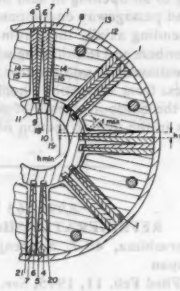
2. a clamping ring concentric with the hub,

a. the hub and the clamping ring defining therebetween an annular damping chamber,

3. a damping fluid in the chamber, and

4. packets of flexible leaf springs arranged in the chamber and extending radially between the hub and the clamping ring, the clamping ring locking the leaf springs in position,

a. each of the packets having outer leaf springs having a cross section transverse to the axis which tapers radially inwardly from an outer end to an inner end thereof, and



b. the outer leaf springs being so dimensioned that their maximum flexure is at least equal to the difference between the thickness of the leaf springs at their outer ends and the thickness of the leaf springs at their inner ends.

3,996,768

PRODUCTION OF TIGHTS ON A CIRCULAR KNITTING MACHINE

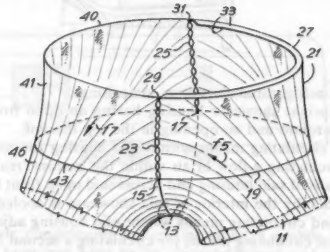
Franco Gariboldi, Condove (Turin), and Ettore Negri, Florence, both of Italy, assignors to Macchine Tessili Circolari Matec S.p.A., Rome, Italy

Filed Aug. 18, 1975, Ser. No. 605,384

Claims priority, application Italy, Aug. 27, 1974, 9556/74

Int. Cl.² D04B *9/00*; A41B *9/02*, *9/04*, *9/10*

U.S. Cl. 66—8 **10 Claims**



1. A process for knitting tights on a circular knitting machine comprising a needle cylinder having needles, said process comprising the steps of forming a first tubular portion of fabric using continuous motion of the needle cylinder, excluding needles along a first, relatively small, needle arc with the stitches being retained by the excluded needles, knitting a first trapezoidal fabric flap along a second needle arc explementary to the first arc, using an oscillating motion of the needle cylinder, excluding needles from the ends of the second arc during knitting of the first flap, said needles being excluded along relatively small third and fourth arcs at the end portions of the second arc and the stitches being retained on the excluded needles, forming an end edge of the flap along a fifth needle arc lying on the second arc between the adjacent ends of the third and fourth arcs and abandoning the edge from the needles of the fifth arc, forming a second trapezoidal fabric flap using an oscillating motion of the needle cylinder, said second flap being formed by knitting an end edge along the

fifth arc, progressively inserting needles along the third and fourth arcs whereby the sides of the second flap are connected to the sides of the first flap, said second flap being completed when all of the needles of the third and fourth arcs have been inserted, and forming a second tubular portion along the first and second arcs using continuous motion of the needle cylinder, the two tubular portions forming respective legs of the tights, and the said edges of the two flaps defining a waist portion of the tights.

3,996,769

NEEDLE CONTROLLING MECHANISM FOR CIRCULAR KNITTING MACHINES

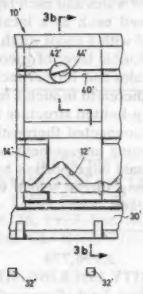
Alfred Schindele, Harthausen, and Gerhard Mueller, Berkheim, both of Germany, assignors to C. Terrot Soehne, Stuttgart, Germany

Filed Dec. 19, 1974, Ser. No. 534,372

Claims priority, application Germany, Oct. 4, 1974, 2447427

Int. Cl.² D04B 9/00

U.S. Cl. 66—50 R **2 Claims**



1. An improvement in a multi-feed circular knitting machine, having a needle cylinder for reciprocally movably supporting a plurality of knitting needles and jacks as well as a cam cylinder surrounding the needle cylinder and adapted to coact with said jacks, said needle cylinder and said cam cylinder being rotatable relative to each other, said jacks are suspended in the needles in an articulated manner, the improvement comprising a plurality of cam systems arranged on said cam cylinder for cooperation with said jacks and adapted to move said needles in knitting and non-knitting positions, each of said jacks is formed as a two-armed lever having a first arm with a first butt cooperating in a first position of the respective jack with a raising cam track in said cam systems for moving selected ones of the needles into their knitting positions, and with a second arm having a second butt cooperating in a second position of the respective jack with a further substantially linear cam track in said cam systems for guiding said needles into their non-knitting positions, a delay-action lowering cam in said further cam track for actuating said second butt to effect a cast-off of any loops held by the non-knitting needles, and pivoting means for pivoting preselected jacks from their first into their second positions and vice versa.

3,996,770

STITCH BONDED FABRICS

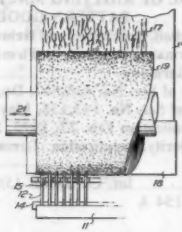
Arno Edgar Wildeman, Aurel House, Blueberry Road, Bowdon, Altrincham, Chester County; David Brunnschweiler, 515 Preston New Road, Blackburn, Lancaster County, and Keith Whalley, 5 Harewood Ave., Simonstone, near Burnley, Lancaster County, all of England

Filed Dec. 14, 1973, Ser. No. 424,779

Claims priority, application United Kingdom, Dec. 16, 1972, 58207/72

Int. Cl.² D04B 23/06

U.S. Cl. 66—85 A **23 Claims**



1. A method of producing a fleece fabric comprising the steps of:

a. feeding a fibre web to a reciprocating compound needle row,

b. laterally moving said fibre web within the vicinity of said needle row so as to extend the web fibres across the needle row as they are fed thereto and thereby facilitate the formation of a stitched structure which has fibres of said web taking part in adjacent stitch rows and adjacent stitch courses whereby through interaction between said reciprocating needles and said fibres a consolidated fibre web or fabric is produced, and

c. withdrawing said consolidated web or fabric from said needle row.

3,996,771

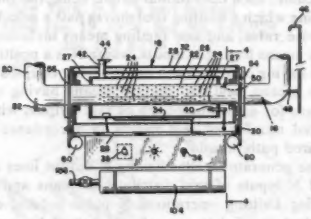
METHOD FOR KNITTING AND HEAT-SETTING CIRCULAR KNIT ARTICLES

Herman M. Routh, 365 Bossong Drive, and Otis H. Allen, Sr., Halifax St., both of Asheboro, N.C. 27703

Division of Ser. No. 396,017, Sept. 10, 1973, Pat. No. 3,906,750. This application Sept. 17, 1975, Ser. No. 614,107

Int. Cl.² D04B 1/26, 9/46, 15/92, 35/00

U.S. Cl. 66—147 **3 Claims**



1. The method of automatically treating knit fabric articles immediately upon discharge from a circular knitting machine to heat set the stitches thereof comprising the steps of, continuously knitting a plurality of fabric articles in succession on a circular knitting machine, discharging each knit fabric article from the machine knitting instrumentalities, conveying each knit fabric article in succession to a prescribed location

through the front door of a heat assembly, having both front and rear doors, immediately upon discharge from the knitting instrumentalities of a knitting machine, closing said front door of a said heat assembly, heat setting the stitches of the knit fabric article, opening said front and rear doors of said heat assembly, and conveying the heat set article knit fabric through the back door of said heat assembly to a prescribed location.

3,996,772

METHOD AND DEVICE FOR THE ELECTRONIC CONTROL OF KNITTING MACHINES KNITTING PATTERN GOODS

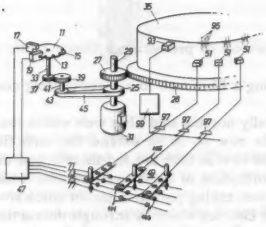
Gernot Gottschall, Boblingen, and Heinrich Elsässer, Stuttgart, both of Germany, assignors to Firma Franz Morat GmbH, Stuttgart, Germany

Continuation of Ser. No. 425,867, Dec. 18, 1973, which is a continuation of Ser. No. 143,135, May 13, 1971, abandoned. This application Feb. 27, 1975, Ser. No. 553,477

Claims priority, application Germany, May 30, 1970, 2026584

Int. Cl.² D04B *15/78*

U.S. Cl. 66—154 A 8 Claims



1. A circular knitting machine comprising the combination:

a. at least one needle bed supporting knitting tools, said knitting tools being independently selectable for knitting purposes;

b. a plurality of knitting systems having electrically controllable selection means mounted along said needle bed for selection of said knitting tools according to a desired pattern;

c. means for generating a first relative motion between said needle bed and said knitting systems for continuously moving said knitting tools past said selection means for knitting purposes;

d. feeding means for feeding electrical signals to said selection means during operational strokes of said knitting machine, each operational stroke being the time interval during which a knitting tool moves past a selection means or vice versa, and said feeding means including distribution means having N inputs, where N is a positive integer, and having outputs, each output being coupled to a selection means, said distribution means having connecting means for connecting each of said outputs with a preselected number of said inputs in accordance with said desired pattern; and

e. pulse generator means having N output lines coupled to said N inputs of said distribution means and producing during knitting operations N pulse modes, each pulse mode being fed to one of said output lines and having electrical signals displaced in phase with respect to the electrical signals of all other pulse modes such that the electrical signals of each of said N pulse modes appear within another operational stroke of groups of N consecutive operational strokes, said pulse modes being produced by use of a carrier provided with markings, by at least two scanning means for scanning said carrier and for continuously producing during knitting operations at least two kinds of electrical signals being displaced in phase and by means for generating a second relative motion between said scanning means and said carrier, said second and said first relative motions being in a rigid relation.

3,996,773

WARP-KNITTED TAPE FOR SLIDE FASTENERS

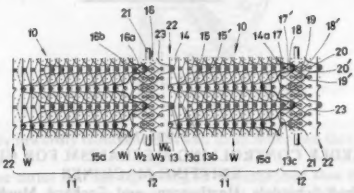
Yoshio Matsuda, Nyuzen, Japan, assignor to Yoshida Kogyo Kabushiki Kaisha, Japan

Filed Nov. 18, 1974, Ser. No. 524,927

Claims priority, application Japan, Nov. 29, 1973, 48-133471[U]

Int. Cl.² D04B *21/14*; A44B *19/40*

U.S. Cl. 66—196 1 Claim



1. A warp-knitted tape for slide fasteners which comprises a web portion and a marginal edge portion extending lengthwise thereof to support a row of interlocking fastener elements, said web portion comprising a plurality of wales formed by chain stitches having a closed lap alternating with an open lap along each wale, tricot stitches interknitted with said chain stitches and transversely extending lapping threads laid over and across a plurality of wales and each lapping thread having opposite U-turns formed each at a location where a chain stitch is interconnected with a tricot stitch, said marginal edge portion comprising a double layer of tricot stitches extending across a plurality of wales and further including a filling core interknitted centrally thereinto in such a manner that the edge portion includes a warp-knitted structure having needle loops and sinker loops interconnected therewith, said sinker loops being urged into fastening engagement with the filling core, said web portion and said edge portion being interconnected by an outermost lapping thread which is stronger than the remaining lapping threads.

3,996,774

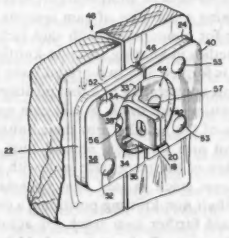
HIGH SECURITY LOCKING MECHANISM

Walter E. Best, c/o Best Lock Corporation, P.O. Box 103, Indianapolis, Ind. 46206

Division of Ser. No. 456,557, April 1, 1974, Pat. No. 3,901,058, which is a division of Ser. No. 309,761, Nov. 27, 1972, Pat. No. 3,820,360. This application Feb. 24, 1975, Ser. No. 552,639

Int. Cl.² E05B *65/48*, *67/36*, *67/38*

U.S. Cl. 70—32 2 Claims



1. A locking mechanism comprising

a hasp including a flat pad adapted to be secured to the face of a door at the edge of the door, said hasp having upper and lower arms extending beyond the edge of the door so as to overlap the edge of an adjacent jamb or companion door,

a central tab between said upper and lower arms projecting forward from said pad to form a hasp eye spaced inward from the ends of the arms so as to stand with its outer face in substantial alignment with the edge of the door,

a keeper including a flat pad adapted to be secured to the face of the jamb or companion door to lie substantially coplanar with the hasp pad when the hasp is in door-closed position, said keeper having upper and lower portions of its front edge positioned to lie in opposed clearance relation with the ends of said arms,

a central tab connected to the edge of said keeper pad between said upper and lower portions and projecting forward from said pad in outward offset relation with said edge to form a keeper eye spaced outward from said edge so as to stand with its outer face in substantial alignment with the edge of said jamb or companion door and in parallel face-to-face relation with the hasp eye,

said hasp and keeper having aligned apertures for the reception of the shackle or bolt of a lock to secure the same together and thereby lock the door to said jamb or companion door,

a hasp shroud plate fitting against the face of said hasp pad and having a cut-out in its outer edge,

a keeper shroud plate fitting against the face of said keeper pad and having an edge cut-out to clear said keeper eye, the cut-outs of said two shroud plates together defining a recess about the base of said forward-projecting eyes,

and a lock having a housing shaped to fit within said recess and enclose said eyes, and having a bolt within said housing engageable with said eyes to lock the hasp and keeper together.

3,996,775

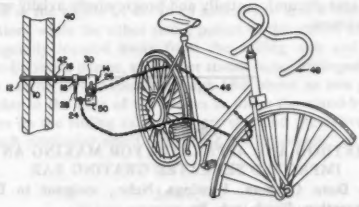
ANCHORING DEVICE FOR SECURING BICYCLES

William K. Waldron, 17801 Snow, Dearborn, Mich. 48124

Filed Sept. 26, 1975, Ser. No. 616,942

Int. Cl.² E05B *73/00*

U.S. Cl. 70—234 **2 Claims**



1. An anchoring device for use in conjuction with a chain and padlock to protect bicycles, such device comprising a head having therethrough a non-circular opening, an elongated bolt for attachment to a fixed support, such elongated bolt being slidably engaged in the non-circular opening and having a cross section matching that of such non-circular opening so as to render the head non-rotatable, a 'U' bolt threadably connected on one end to the head, an eye on the other end of the 'U' bolt, and a hasp threadably engaged on the elongated bolt for receiving therethrough the eye on the 'U' bolt.

3,996,776

STRIP THICKNESS CONTROL

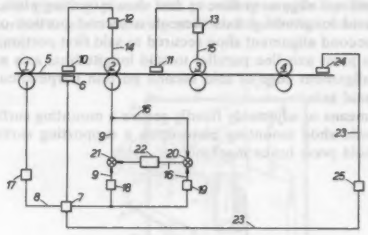
Greyham Frank Bryant, and Peter David Spooner, both of London, England, assignors to Gec-Elliott Automation Limited, London, England

Filed Mar. 3, 1975, Ser. No. 554,608

Claims priority, application United Kingdom, Mar. 5, 1974, 9859/74

Int. Cl.² B21B *37/12*

U.S. Cl. 72—9 **11 Claims**



1. A method of controlling the thickness of a strip in a tandem mill, having at least three roll stands, to produce output strip of the desired thickness, the method comprising the steps of:

1. at a first lower strip speed (a) sensing an error in strip thickness between a first and a second stand, said second stand being downstream from said first stand and (b) correcting the thickness error solely in said second stand,
2. at a second higher strip speed (a) sensing an error in strip thickness between the first and second stand and (b) correcting the thickness error in at least one stand downstream from said second stand, and making no thickness error correction in the second stand,
3. at strip speeds intermediate between said first and said second speeds (a) sensing an error in strip thickness between the first and second stand and (b) correcting the thickness error both in the second stand and in at least one stand downstream from said second stand, the proportion of error corrected in the second stand decreasing as said speed rises between said first and second speeds and the proportion of thickness error being corrected in the stands downstream from said second stand increasing as speed rises between said first and second speeds.

3,996,777

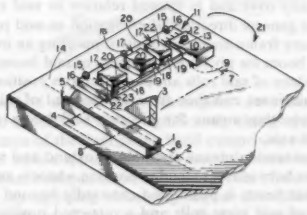
PRESS BRAKE WORK PIECE ALIGNMENT APPARATUS

Rolf Ekberg, Chicago, Ill., assignor to Lawrence Peska Associates, Inc., New York, N.Y., a part interest

Filed Jan. 19, 1976, Ser. No. 649,929

Int. Cl.² B21D *11/22*

U.S. Cl. 72—36 **8 Claims**



1. In a press brake machine comprising a stationary lowermost forming die, an uppermost forming die, longitudinal

opposing surfaces of said uppermost and lowermost forming dies adapted to form a bend in a portion of the surface of a work material located therebetween along a longitudinal line, the improvement comprising:

a. means to adjustable fixedly secure a first alignment shoe along the longitudinal axis of a longitudinal shoe mounting plate, said first alignment shoe having an alignment edge thereof parallel to said longitudinal line and perpendicular to said longitudinal axis,

b. means to adjustably fixedly secure a first portion of a second alignment shoe to said shoe mounting plate along said longitudinal axis thereof, a second portion of said second alignment shoe secured to said first portion along a pivot axis line parallel to said longitudinal axis and an alignment edge of said second portion perpendicular to said axis,

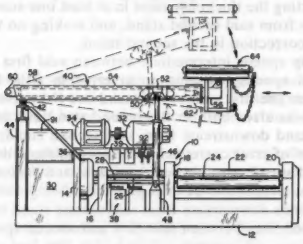
c. means to adjustably fixedly secure a mounting surface of said shoe mounting plate upon a supporting surface of said press brake machine.

3,996,778

LOADER AND UNLOADER FOR PLATE ROLL MACHINE

Charles H. Sparks, Eugene, Oreg., assignor to Steel Structures, Inc., Eugene, Oreg.

Filed Dec. 8, 1975, Ser. No. 638,534
Int. Cl.² B21D *43/00, 45/00*
U.S. Cl. 72—134 **18 Claims**



1. In a plate roll machine having plural long generally parallel cooperative plate rolls and a drive and control system including means at an inner end of said plate rolls for rotating said rolls and for selectively separating said rolls for inserting a workpiece therebetween from an opposite outer end of said rolls,

loading and unloading means for said plate rolls comprising:

a longitudinally extensible boom extending generally horizontally over and in spaced relation to said rolls in the same general direction of elongation as said rolls,

stationary frame means pivotally supporting an inner end of said boom for pivoting movement of said boom in a vertical plane of said rolls about a pivot axis positioned closer to said inner end than to said outer end of said rolls,

boom-pivoting means for pivoting said boom about said pivot axis,

boom extension means operable to extend and retract said boom between an extended position wherein an outer end of said boom is positioned outwardly beyond said outer end of said plate rolls and a retracted position wherein said outer end of said boom overlies said plate rolls,

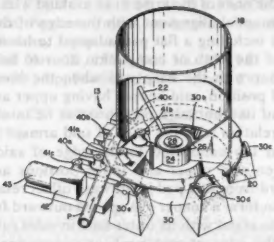
and carriage means mounted at said outer end of said boom for supporting a rolled plate at an upper inside surface thereof.

3,996,779

PIPE STORAGE APPARATUS AND METHOD

Royal T. Hawley, Everett, Wash., assignor to Western Gear Corporation, Everett, Wash.

Filed Feb. 10, 1975, Ser. No. 548,267
Int. Cl.² B21D *7/08*
U.S. Cl. 72—142 **13 Claims**



1. A method of coiling a long length of heavy duty pipe, comprising:

advancing the pipe along a path through a bending station,

bending the advancing pipe at the bending station about a generally vertical axis of a guide cylinder by applying circumferentially-spaced bending forces from within a vertical cylindrical guide path and circumferentially-spaced bending forces from without the vertical cylindrical guide path to form the pipe into a partial first convolution,

guiding and supporting the advancing bent pipe at circumferentially and progressively axially spaced locations along the cylindrical guide path to form a completed first convolution of a diameter slightly larger than said guide cylinder immediately beyond said bending station, which convolution is progressively axially inclined along the cylindrical guide path,

moving the first convolution lengthwise of the guide cylinder along the vertical cylindrical guide path by progressively forming a second convolution of the same diameter as the first convolution in the advancing pipe in the same circumferential plane below the first convolution in the same way that the first convolution was formed, and

continuing to form in the advancing pipe additional convolutions one on another in the same manner and each in the same circumferential plane encircling the guide cylinder so that the weight of all of the convolutions is carried at said circumferentially and progressively axially spaced locations.

3,996,780

METHOD AND APPARATUS FOR MAKING AN IMPROVED SERRATED GRATING BAR

Wayne Dean German, Hastings, Nebr., assignor to Dravo Corporation, Pittsburgh, Pa.

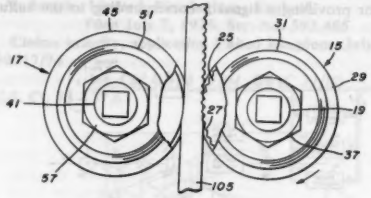
Filed July 2, 1975, Ser. No. 592,377
Int. Cl.² B21H *7/00, 8/00*
U.S. Cl. 72—187 **7 Claims**

1. A process for producing notched grating bars from a coiled metal strip comprising the steps of:

a. applying torque to a toothed notching wheel for drawing the coiled strip between the toothed notching wheel and a smooth bearing wheel spaced apart from the notching wheel a distance less than the width of the strip to effect, through cold working of the strip, longitudinal stretching with resultant flattening of the strip and notching of the edge engaged by said toothed notching wheel; and

b. simultaneously confining the lateral faces of the strip

adjacent both edges thereof to effect edging of the strip and to prevent the cold flowing of the metal transverse to



said lateral faces whereby a finished, notched grating bar is produced directly from the coiled strip.

3,996,781

ROLLING MILLS

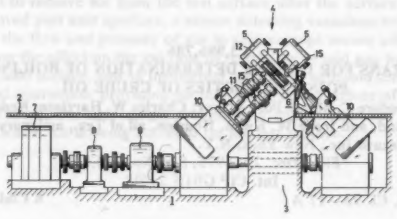
Norbert Nuckel, Dusseldorf, Germany, assignor to Firma Friedrich Kocks, Dusseldorf, Germany

Filed Dec. 3, 1975, Ser. No. 637,410

Claims priority, application Germany, Dec. 7, 1974, 2458087

Int. Cl.² B21B *31/08, 1/16*

U.S. Cl. 72—221 **11 Claims**



1. A rolling mill for wire, light sections and tubular products, which rolling mill has a fixed rolling axis and comprises a plurality of roller stands which are arranged directly one behind the other and each of which has two driven working rollers which extend parallel to one another and transversely of the rolling direction, the working rollers of each stand defining at least two sizing passes only one of which is disposed in the region of the fixed rolling axis and is used in this location, while the other sizing passes of the stands are interchangeably located away from the rolling axis and act as stand-by sizing passes, said roller stands being arranged so that each can be turned round through 180° about an axis perpendicular to the axes of the rollers to place the stand-by sizing passes on the rolling axis, the entry side and the delivery side of each particular stand thus being interchanged.

3,996,782

CHAIN CUTTING APPARATUS

Vincent F. Sgariglia, 1044 Ashland Ave., Chicago Heights, Ill. 60411

Filed July 17, 1975, Ser. No. 596,830

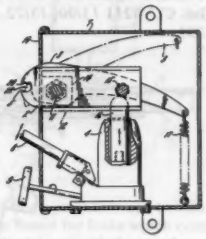
Int. Cl.² B21D *28/00*

U.S. Cl. 72—332 **8 Claims**

1. An apparatus for shearing and bending a chain link, said apparatus comprising:

a first shearing member, said first shearing member having one surface defining a shearing plane and terminating in a first shearing edge, said first shearing member having a U-shaped recess, the surfaces of said recess lying substantially perpendicular to said shearing plane and spaced apart a distance slightly greater than the maximum thickness of the chain links to be cut, one of said recess surfaces being a primary bearing surface to exert shearing and bending forces upon a chain link, the other of said recess surfaces providing a secondary bearing surface for preventing unrestrained twisting during the shearing and bending operations;

a second shearing member, said second shearing member having a surface defining a shearing plane and terminating in a second shearing edge, said second shearing member having another surface substantially perpendicular to said shearing plane, and providing a primary bearing surface to exert shearing and bending forces upon a chain link;



means for connecting said first and second shearing members for relative shearing action between said primary bearing surfaces and shearing edges; and

means for moving the primary bearing surface and second shearing edge of said second shearing member toward and beyond the primary bearing surface and first shearing edge of said first shearing member to shear a chain link along said shearing plane and to bend the severed ends apart while the link is restrained against excessive twisting by said secondary bearing surface, to generate an opening between the severed ends of said link greater than the thickness of said link.

3,996,783

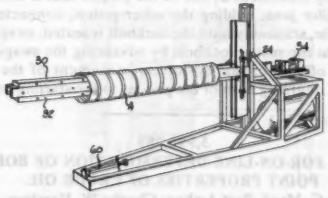
METHOD AND APPARATUS FOR REFORMING ROUND DUCTS INTO RECTANGULAR DUCTS

Robert Henry Meserole, Toledo, Ohio, assignor to Johns-Manville Corporation, Denver, Colo.

Filed Jan. 23, 1975, Ser. No. 543,701

Int. Cl.² B21B *17/02*

U.S. Cl. 72—370 **3 Claims**



1. A method of making a rectangular duct that is light weight and bendable without significantly changing the cross-sectional area of the duct at the bend comprising reshaping a round thin walled spirally grooved metal duct having a metal wall thickness between three mils and six mils into a rectangular shape by applying reforming forces simultaneously to different portions of the interior surface of the round duct, said reforming forces having a vertical displacement with respect to one another, but having no significant horizontal displacement with respect to one another, wherein the magnitude of the reforming forces is sufficient to cause the metal in

the duct to slightly yield to prevent the tendency of the reformed duct to partially return to its original shape after the reforming forces are removed.

3,996,784

SINGLE OPERATION-TRIPLE CYCLE LOCKBOLT SETTING DEVICE AND SYSTEM

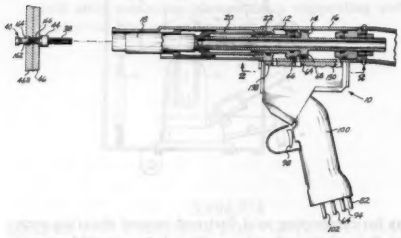
Louis A. Champoux, Seattle, and Hollis B. Merrell, Renton, both of Wash., assignors to The Boeing Company, Seattle, Wash.

Filed Oct. 21, 1974, Ser. No. 516,537

Disclosure was also published under second Trial Voluntary Protest Program on Feb. 17, 1976

Int. Cl.² B21J *15/00, 15/22, 15/12*

U.S. Cl. 72—391 **13 Claims**



1. A lockbolt setting apparatus having a nose piece for grasping a pintail of a bolt and an anvil for swaging a collar to the bolt wherein the apparatus comprises: a housing having a stand off to provide clearance to the collar to permit seating a lockbolt without exerting pressure on the collar; a first piston connected to the anvil to provide sliding movement of the anvil within the housing; a second piston connected to the nose piece to provide sliding movement of the nose piece within the structure of the anvil; and means for sequencing and powering the apparatus to first, move the second piston to seat the bolt, second, to move the first piston in the opposite direction to swage the collar, third, to move the second piston an additional amount to break off the pintail of the bolt, and fourth, to move both pistons back to the original position.

11. A method of setting lockbolts with the steps comprising: providing clearance for a collar positioned on a lockbolt; grasping a pintail of the lockbolt with puller jaws; introducing hydraulic fluid under pressure between a pair of pistons for moving the pistons in opposite directions and seating the lockbolt by movement of one of the pistons that is connected to the puller jaws; holding the other piston, connected to a swaging die, stationary until the lockbolt is seated; swaging the collar onto the seated lockbolt by advancing the swaging die; breaking off the pintail by further movement of the puller jaws; and returning both of the pistons to the starting position.

3,996,785

MEANS FOR ON-LINE DETERMINATION OF BOILING POINT PROPERTIES OF CRUDE OIL

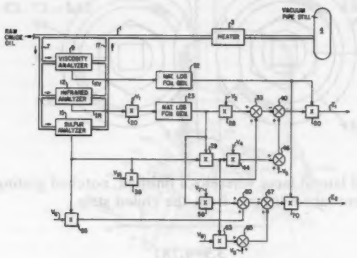
Theodore C. Mead, Port Arthur; Charles W. Harrison, Nederland, and Irene W. Kwan, Houston, all of Tex., assignors to Texaco Inc., New York, N.Y.

Filed Dec. 29, 1975, Ser. No. 644,473

Int. Cl.² G01N *25/08*

U.S. Cl. 73—17 A **6 Claims**

1. A boiling point analyzer for on-line determination of at least one boiling point property of crude oil flowing in a line comprising means for sampling the crude oil and providing samples, viscosity analyzing means receiving samples of the crude oil and providing a signal KV corresponding to the kinematic viscosity of the crude oil, infrared analyzing means connected to the sampling means and receiving a sample for providing a signal IR corresponding to the infrared absorption of the crude oil at a predetermined wavelength, sulfur analyzing means connected to the sampling means and receiving a sample for providing a signal S corresponding to the sulfur



content of the crude oil, and boiling point signal means connected to all the analyzing means for providing a boiling point signal corresponding to a boiling point property of the crude oil.

3,996,786

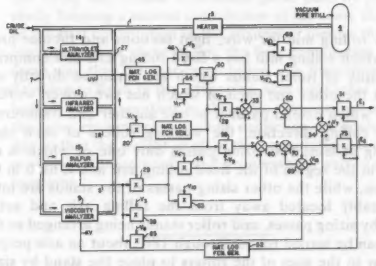
MEANS FOR ON-LINE DETERMINATION OF BOILING POINT PROPERTIES OF CRUDE OIL

Theodore C. Mead, Port Arthur; Charles W. Harrison, Nederland, and Irene W. Kwan, Houston, all of Tex., assignors to Texaco Inc., New York, N.Y.

Filed Dec. 29, 1975, Ser. No. 644,500

Int. Cl.² G01N *25/08*

U.S. Cl. 73—17 A **6 Claims**



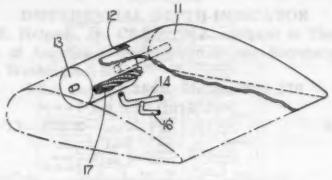
1. A boiling point analyzer for on-line determination of at least one boiling point property of crude oil flowing in a line comprising means for sampling the crude oil and providing samples, viscosity analyzing means receiving samples of the crude oil and providing a signal KV corresponding to the kinematic viscosity of the crude oil, infrared analyzing means connected to the sampling means and receiving a sample for providing a signal IR corresponding to the infrared absorption of the crude oil at a predetermined wavelength, ultraviolet analyzing means connected to the sampling means and receiving a sample for providing a signal UV corresponding to the ultraviolet absorption of the crude oil at another predetermined wavelength, sulfur analyzing means connected to the sampling means and receiving a sample for providing a signal S corresponding to the sulfur content of the crude oil, and boiling point signal means connected to all the analyzing means for providing a boiling point signal corresponding to a boiling point property of the crude oil.

3,996,787

APPARATUS FOR INDICATING ICE ACCRETION

Geoffrey Edgington, Godalming, England, assignor to Lucas Industries Limited, Birmingham, England

Filed July 7, 1975, Ser. No. 593,485
Claims priority, application United Kingdom, July 9, 1974, 30317/74
Int. Cl.² G01B 13/04; G01C 21/00
U.S. Cl. 73—37.6 9 Claims



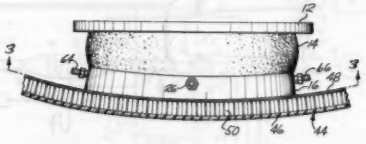
1. Apparatus for indicating rate of ice accretion including, test surface upon which ice forms in use, passage means terminating adjacent said surface in an aperture which is presented to, and spaced by a known gap from, said surface, means for generating a flow of gas in said passage means towards said aperture, a drive arrangement driving said test surface past said aperture at a known speed, an ice removal device operable to remove ice from the test surface after the surface has moved past said aperture, a sensor detecting variations in one of the flow and pressure of gas in said passage means arising from the effect on the gas flow of restriction of said gap by ice on said surface, and an instrument associated with said sensor, said instrument providing an indication of the extent of the variation, and accordingly providing an indication of the rate at which ice is being accreted on the test surface.

3,996,788

FLOW RESISTANCE APPARATUS AND METHOD FOR ASSEMBLED ACOUSTIC PANELS

Robert Byron Purves, Renton, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed Aug. 6, 1975, Ser. No. 602,494
Int. Cl.² G01N 15/08
U.S. Cl. 73—38 12 Claims



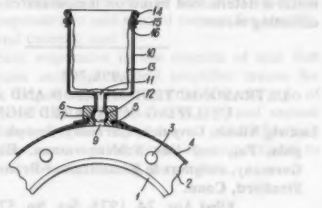
1. A device for measuring flow resistance through a permeable face sheet of a panel having a permeable face sheet, a solid sheet and a honeycomb core between the sheets wherein the device comprises: a puck to contact a permeable face sheet, said puck having compartments separated by resilient members having a width of compartment plus resilient member less than a cell width of a honeycomb core; means for introducing a regulated flow of gas to alternate compartments; means for removing the gas from intermediate compartments; and means for measuring difference in gas pressure between alternate and intermediate compartments.

3,996,789

LEAK DETECTION

David Robert Wilson, Stockton-On-Tees, England, assignor to Imperial Chemical Industries Limited, London, England

Continuation of Ser. No. 356,165, May 1, 1973, abandoned.
This application Mar. 28, 1975, Ser. No. 562,820
Claims priority, application United Kingdom, May 10, 1972, 21800/72; Feb. 7, 1973, 6033/73
Int. Cl.² G01M 3/14
U.S. Cl. 73—40.5 R 9 Claims



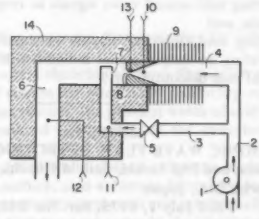
1. Means for enclosing a joint between two flanged pipes so that said joint can be tested for leaks which comprises a resilient gas impermeable strip provided at each end with a hole and a joining piece which comprises a stud adapted to be passed through both holes of the resilient strip to hold said strip in position thus forming a circulet around the flanged pipe joint, said stud forming an axial opening therethrough to said joint thereby providing a testing port, said stud having chamfered abutments extending from its base and shaped to fill the space between the resilient strip and the pipe flanges near to the stud being formed with an enlarged head spaced from the abutments.

3,996,790

APPARATUS FOR MEASURING SATURATION TEMPERATURE OF LIQUID METAL OXIDE

Michio Murase, Kawasaki; Isao Sumida, and Koichi Kotani, both of Sagamihara, all of Japan, assignors to Hitachi, Ltd., Japan

Filed July 17, 1974, Ser. No. 489,120
Claims priority, application Japan, July 17, 1973, 48-79875
Int. Cl.² G01N 11/00
U.S. Cl. 73—61 LM 9 Claims



1. An apparatus for measuring the saturation temperature of an oxide in liquid metal which comprises a main passage for liquid metal which is branched into a high temperature passage and a low temperature passage, a coupling passage for connecting said high temperature passage and low temperature passage, a liquid metal-projecting outlet disposed in said high temperature passage and opened to said coupling passage, another liquid metal-projecting outlet disposed in said low temperature passage and opened to said coupling passage in the state facing said outlet disposed in the high temperature passage, cooling means connected to in the low temperature

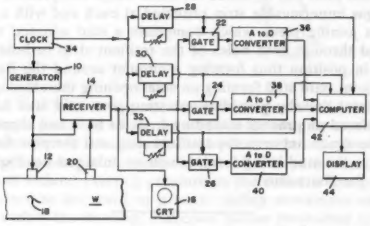
passage between the division point from the high temperature passage and said outlet of the low temperature passage to cool liquid metal running through the low temperature passage, and temperature-detecting means disposed in the vicinity of the outlet of the low temperature passage to detect the temperature around said outlet of the low temperature passage; liquid metal projected from the outlet of the low temperature passage and liquid metal projected from the outlet of the high temperature passage, between which there is a temperature difference, being mixed with each other in the coupling passage, wherein the saturation temperature of an oxide in liquid metal is determined based on temperatures measured by said detecting means.

3,996,791

ULTRASONIC TEST METHOD AND APPARATUS UTILIZING SCATTERED SIGNALS

Ludwig Niklas, Lovenich, Germany; Joseph L. Rose, Philadelphia, Pa., and Udo Schlengermann, Hurth-Hermulheim, Germany, assignors to Krautkramer-Branson, Incorporated, Stratford, Conn.

Filed Apr. 24, 1975, Ser. No. 571,076
Int. Cl.² G01N *29/04*
U.S. Cl. 73—67.7 **15 Claims**



1. The method of evaluating a defect in a workpiece by the ultrasonic pulse echo principle comprising:

transmitting an ultrasonic search pulse signal into a workpiece; sensing the back reflected acoustic wave signal arising from the search pulse signal intercepting an acoustic discontinuity in the workpiece;

sensing further the scattered longitudinal wave and the scattered shear wave acoustic signal responsive to scattering of the transmitted pulse signal by said discontinuity;

converting said sensed wave signals to respective electrical signals, and

subjecting said electrical signals to transform analysis for providing an output signal indicative of the characteristics of said discontinuity.

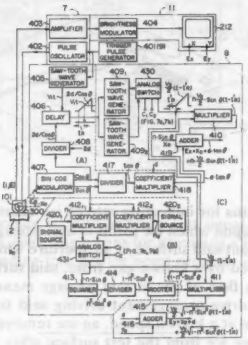
3,996,792

SUPERSONIC WAVE FLAW DETECTING APPARATUS

Jun Kubota, and Soji Sasaki, both of Hitachi, Japan, assignors to Hitachi, Ltd., Japan

Filed July 1, 1975, Ser. No. 592,359
Claims priority, application Japan, July 3, 1974, 49-75313
Int. Cl.² G01N *29/04*
U.S. Cl. 73—67.8 S **13 Claims**

1. A supersonic wave flaw detecting apparatus comprising a variable angle beam probe for performing sector scanning by transmitting and receiving a supersonic wave beam while maintaining acoustic contact with an object of inspection, said probe generating an electrical signal in accordance with the direction of transmission and receiving of the supersonic wave beam, a display unit for displaying an acoustic sectional image of said object on a display screen of said display unit, said display unit brightness-modulating the display scanning lines with an echo signal of said supersonic wave beam received from said object by said variable angle beam probe, said display scanning lines being associated with the transmission path and transmission velocity of said supersonic wave beam in said object of inspection, an angle detector for detecting the incident angle of said supersonic wave beam from said variable angle beam probe and generating an angular signal, a scanning mode control device for generating command signals in accordance with the two modes of the longitudinal wave and shear



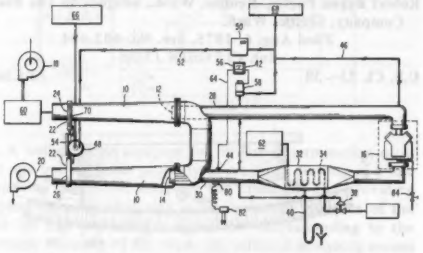
wave in response to the angular signal from said angle detector, and a scanning signal generator for producing a display scanning signal for said display unit in accordance with the velocity and direction of transmission of a selected one of the longitudinal wave and shear wave of the supersonic wave beam in response to said command signals produced from said scanning mode control device and said angular signal produced from said angle detector.

3,996,793

PRESSURE CONTROL TEST APPARATUS

Robert Topper, 103 Buckingham Ave., Trenton, N.J. 08618

Filed Apr. 5, 1976, Ser. No. 673,774
Int. Cl.² G01M *15/00*
U.S. Cl. 73—117.1 **16 Claims**



1. A pressure control test apparatus for providing a predetermined simulation of operating conditions to a test unit comprising:

a. a plenum chamber containing a closely controlled volume and mass flow of air and a closely controlled air pressure therein, said plenum chamber defining an inlet and an outlet for communication of air therein to and from a test unit;

b. an intake blower and an exhaust blower operatively connected to said plenum chamber to supply air thereto and to withdraw gas therefrom, respectively;

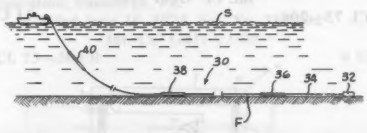
c. air valve means positioned between said blowers and said plenum chamber to control the amount and pressure of air within said plenum chamber;
d. an intake conduit extending from said inlet of said plenum chamber to the air intake of a test unit; and
e. an exhaust conduit extending from the exhaust of a test unit to said outlet in said plenum chamber.

3,996,794

DIFFERENTIAL DEPTH INDICATOR

Robert E. Helgans, Jr., Chester, N.J., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Oct. 17, 1966, Ser. No. 588,270
Int. Cl.² G01D 3/00
U.S. Cl. 73—170 A **5 Claims**



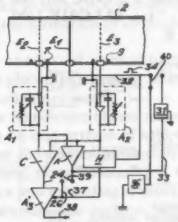
1. A system of instrumentation for determining differential depths existing at a plurality of spaced zones along an underwater cable which comprises,
a. a unit formed of a pair of pressure transmitting devices located in spaced relation in each of said zones and operative by the surrounding water pressure,
b. an independent transducer in communication with each of said pair of pressure transmitting devices and operative to develop a first signal in each zone which is indicative of differential pressure and
c. an independent converter having a direct connection with each transducer which is operative to convert each first signal into a second signal which is indicative of differential depth whereby the difference in depths among the zones may be determined.

3,996,795

IONIZATION FLOW DETECTOR

Alfred Servassier, Versailles, France, assignor to Institut Francaise du Petrole, des Carburants et Lubrifiants et Entreprise de Recherches et d'Activities Petrolieres Elf, Paris, France

Filed Dec. 11, 1974, Ser. No. 531,508
Claims priority, application France, Dec. 11, 1973, 73.44237
Int. Cl.² G01F 1/56
U.S. Cl. 73—194 F **12 Claims**



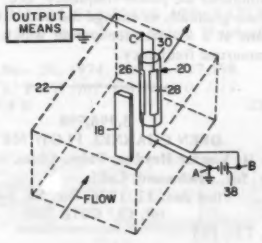
1. An ionization flow detector for measuring the flow velocity of a flowing gas stream comprising:
first electrode means E_1 for emitting ions in directions parallel to the flow of said gas stream through the "Corona" effect;
high voltage supply means for applying a high voltage to said first electrode means;
second electrode means E_2 for collecting ions emitted from said first electrode means thereby generating a first current, said second electrode means being located directly up stream of said first electrode means;
third electrode means E_3 for collecting ions emitted from said first electrode means thereby generating a second current, said third electrode means being located directly down stream of said first electrode means;
first amplifier means connected to said second electrode means and responsive to said first current for amplifying said first current;
second amplifier means connected to said third electrode means and responsive to said second current for amplifying said second current; and
calculation means responsive to the outputs of said first amplifier means and said second amplifier means for generating an output which is proportional to the ratio of the difference of the outputs of said first and second amplifier means to the sum of the outputs of said first and second amplifier means, said ratio being proportional to the flow velocity of said flowing gas stream.

3,996,796

FLOW METER

Meryle D. W. Adler, Bradford, Pa.; John T. Brown, and Ronald J. Weetman, both of Corning, N.Y., assignors to Corning Glass Works, Corning, N.Y.

Filed Mar. 10, 1975, Ser. No. 556,810
Int. Cl.² G01F 1/32
U.S. Cl. 73—194 VS **11 Claims**



1. Flow metering apparatus for measuring the velocity of a fluid stream comprising
an elongated vortex shedding element disposed transversely in said fluid stream for alternately producing vortices on opposite sides thereof, the greatest width of said shedding element measured transversely of the direction of fluid flow being equal to W,
an elongated cylindrically shaped substrate having a nonconductive surface, said substrate being disposed downstream of said shedding element and substantially parallel thereto, the distance between said shedding element and said substrate being between W and 1.5W,
a pair of resistive films disposed on opposite sides of the upstream surface of said substrate, the resistivity of said films being variable with temperature,
means connected to opposite ends of said resistive films for causing a current to flow therethrough that is sufficient to heat said films to a temperature above that of the fluid stream, and
means for detecting the periodic changes in resistance of said films as said vortices cause differential cooling of said films, and for providing an electrical output indicative of the velocity of said fluid stream.

3,996,797

MAGNETIC FLOWMETER

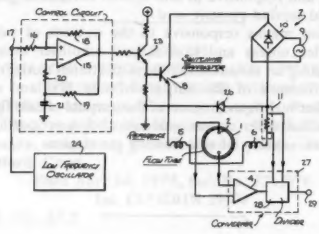
Takashi Torimaru; Kazuie Suzuki, both of Tokyo; Hiromu Kakiura, and Tamotsu Kobayashi, both of Yokohama, all of Japan, assignors to Hokushin Electric Works, Ltd., Tokyo, Japan

Filed Jan. 22, 1976, Ser. No. 651,525

Claims priority, application Japan, Jan. 24, 1975, 50-10271; Feb. 27, 1975, 50-24780

Int. Cl.² G01F 1/60

U.S. Cl. 73—194 EM **5 Claims**



1. In an electromagnetic flowmeter provided with a flow tube through which the fluid to be metered is conducted, the tube having a pair of electrodes mounted at diametrically-opposed positions thereon and including excitation coils to establish a magnetic field in the tube which is transverse to the direction of flow, the combination comprising:

A. switching means interposed between said coils and a power source;

B. control means to effect "on-off" control of said switching means at a rate which is higher than a predetermined commercial a-c power frequency; and

C. means gradually to change the duty ratio of said control means at a low-frequency rate which is less than said commercial frequency.

3,996,798

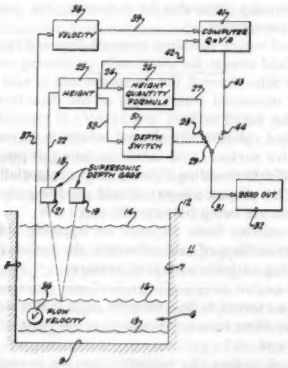
OPEN CHANNEL FLOW METER

William H. Vander Heyden, Tulsa, Okla., assignor to Badger Meter, Inc., Richmond, Calif.

Filed Jan. 12, 1976, Ser. No. 648,103

Int. Cl.² G01F 7/00

U.S. Cl. 73—195 **6 Claims**



1. A flow meter for use in an open channel having a known cross-section comprising means for detecting the level of liquid flowing in said channel and supplying a corresponding level signal, means for substituting said level signal in a known formula relating liquid level and quantity of liquid flow and providing a related first output, means for measuring the velocity of liquid flow in said channel and supplying a corresponding velocity signal, means for combining said level signal and said velocity signal and providing a related second output, a readout, a switch connecting said readout selectively to said first output and to said second output, and means responsive to said level signal for selectively operating said switch.

3,996,799

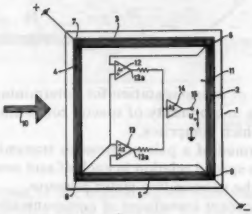
DEVICE FOR MEASURING THE FLOW VELOCITY OF A MEDIUM

Antonius Ferdinandus Petrus van Putten, 13, Hofstedehoekweg, Enschede, Netherlands

Filed Sept. 29, 1975, Ser. No. 617,752

Int. Cl.² G01F 1/68

U.S. Cl. 73—204 **11 Claims**



1. Device for measuring the flow velocity of a medium, comprising an insulating silicon, semiconductor chip, two flat temperature sensitive elongated sensing resistors deposited on said silicon semiconductor chip with two respective longitudinal axes including an angle of about 90°, two other resistors on said chip, said first-mentioned resistors being connected with said two other resistors into a bridge configuration of which two opposite points are connected to a current source, an amplifier made as an integrated circuit of very small dimensions of which the components are deposited on the semiconductor chip in the space delimited by the sensing resistors, the two other opposite points of said bridge configuration on said chip being connected to the input of said amplifier on said chip.

3,996,800

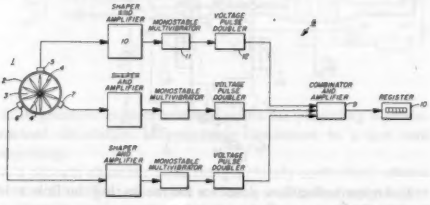
TURBINE METER

John B. Rosso, Tulsa, Okla., assignor to Combustion Engineering, Inc., Windsor, Conn.

Filed May 17, 1974, Ser. No. 470,891

Int. Cl.² G01F 1/00

U.S. Cl. 73—231 R **3 Claims**



1. A system utilizing a turbine meter for measuring fluid flow, including,

a turbine meter having a plurality of blades arranged to be rotated from a common axis by fluid flow to be measured,

a plurality of electromagnetic pick-up units positioned

about the circle of the blade tips said plurality of blades intersecting magnetic lines of force generated by said pick-up units to produce pulses,

a plurality of circuits corresponding in number to said plurality of pick-up units, each of said circuits connected to a corresponding one of said pick-up units to multiply said pulses and provide a predetermined total number of pulses per volume unit of fluid flowing through the meter,

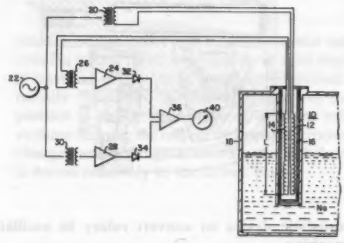
and means connected to the circuit of each pick-up unit to combine their multiplied into a single train and manifest the train quantitatively as the flow of fluid.

3,996,801

LIQUID METAL LEVEL SENSOR WITH INCREASED SENSITIVITY

Kerwin C. Playfoot, Horseheads, and William H. Todt, Elmira Heights, both of N.Y., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed June 16, 1975, Ser. No. 587,792
Int. Cl.² G01F *23/00*
U.S. Cl. 73—304 R **4 Claims**



1. A liquid level sensor for conductive liquids comprising a bifilar wound transformer probe means immersible in a liquid coupled to a power supply and sensing means which correlates transformer probe inductance changes to the liquid level, the improvement wherein the secondary coil of the transformer probe has a smaller diameter cable than the primary coil cable.

3,996,802

DEVICE FOR TESTING STERILIZATION APPARATUS

Robert F. Smith, 1023 Troy Court, Troy, Mich. 48084

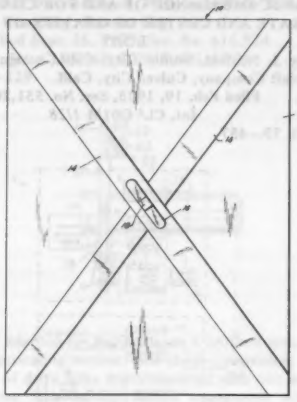
Filed Sept. 11, 1975, Ser. No. 612,333
Int. Cl.² G01K *11/20, 1/02*
U.S. Cl. 73—356 **6 Claims**

1. A device for testing the level, uniformity and duration of the temperature in apparatus for sterilizing articles used in hospitals and the like to indicate if incomplete sterilization has occurred owing to the formation of air pockets or the like, said device comprising:

unitary support means of substantially flat sheet form adapted to be placed adjacent to articles to be sterilized in said sterilization apparatus,

first temperature responsive means mounted in a predetermined pattern on one surface of said support means and extending from the center portion to the edge portions thereof, said first means covering a substantial area of said one surface and extending in more than one direction edge to edge on said one surface, said first means being adapted to change conditions when exposed to a predetermined temperature to indicate the uniformity of the temperature to which said one surface of said support means is exposed, and

second temperature responsive means mounted on said support means substantially at the center portion thereof, said second means comprising a material that changes condition when exposed to a selected temperature for a predetermined time period, whereby said second means indicates whether said selected temperature is reached



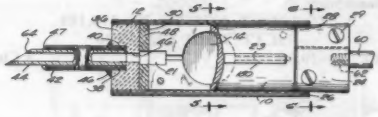
for said predetermined time period at the center portion of said support means.

3,996,803

MOLTEN METAL SAMPLING APPARATUS

Richard A. Falk, 519 Westminster Drive, Waukesha, Wis. 53186

Filed Nov. 26, 1974, Ser. No. 527,198
Int. Cl.² B01L *3/02*; G01N *1/10, 1/14*
U.S. Cl. 73—425.4 R **22 Claims**



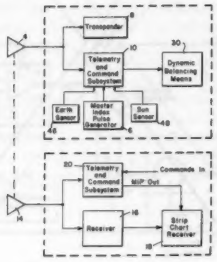
6. Molten metal sampling apparatus comprising a reusable sample mold having wall portions defining a sample cavity, wall means defining a sample inlet passage in communication with said cavity, said reusable mold having an end surface through which said sample inlet passage is open, and including a disposable fill tube assembly connectable with said reusable mold during use, said fill tube assembly including a housing, rigid wall means at one end of said housing defining an abutment and a fill passage, said fill passage communicating with the inside of said housing, and wherein said mold is sized to be received in said housing with registry of said inlet passage and said fill passage for communication of said inlet passage and said fill passage, and sealing means in the form of a compressible and heat resistant gasket disk between said mold and said abutment said gasket having an aperture to provide a continuous flow path through said fill passage into said sample mold and seal the mold end surface in said housing and prevent metal flow around said end surface of said reusable mold adjacent said sample inlet passage when said mold is in said housing and said gasket is compressed against said abutment and afford separation of said fill tube assembly and said mold when a sample is obtained.

3,996,804

METHOD FOR REMOTELY DETERMINING THE DYNAMIC IMBALANCE OF AND FOR CHANGING THE SPIN RATE AND CENTER OF GRAVITY OF A SPINNING BODY

Murray J. Neufeld, Studio City, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.

Filed Feb. 19, 1975, Ser. No. 551,206
Int. Cl.² G01M 1/28
U.S. Cl. 73—457 2 Claims



1. A method for determining the periodic wobble of a free spinning body, comprising the ordered steps of:

radiating electromagnetic energy in a known pattern from said body;

directing said radiated electromagnetic energy at a remotely located electromagnetic energy detector;

detecting the magnitude of said radiated electromagnetic energy; and

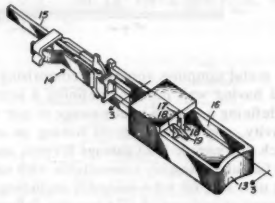
determining the peak-to-peak fluctuation of the detected magnitude of said radiated electromagnetic energy to yield a resultant which is proportional to the magnitude of said periodic wobble of said body.

3,996,805

PUSHBUTTON ASSEMBLY FOR A RADIO TUNER

Alfred James Clark, Palatine, Ill., assignor to Motorola, Inc., Schaumburg, Ill.

Filed May 2, 1975, Ser. No. 574,189
Int. Cl.² H01H 3/12, 13/14
U.S. Cl. 74—10.33 3 Claims



1. In a pushbutton type radio tuner for selecting various ones of a number of predetermined frequencies, an improved pushbutton assembly comprising:

pushbutton means having a cavity on the underside thereof, an interior wall portion within the cavity and having a longitudinal slot leading from the rear of the pushbutton means to the cavity; and

an arm member for initiating the frequency selection, the arm member having an outer end portion of a dimension to be received by the pushbutton slot, a body portion having substantially the dimensions of the slot, and a narrowed portion between the end and body portions, the body portion being received in the slot, and the end portion of the arm member extending into the cavity, the end portion coming into abutting relation with the end of the interior wall portion of the pushbutton when rotated out of alignment with the body portion,

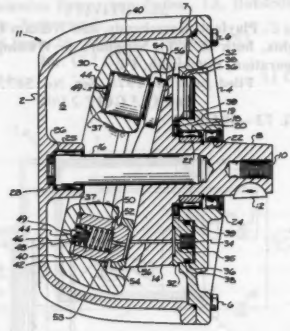
whereby the pushbutton is removably retained on the arm member.

3,996,806

HYDROSTATIC TRANSMISSION WITH OSCILLATING OUTPUT

Frank N. Alexander, Hutchinson, Kans., assignor to The Cessna Aircraft Company, Wichita, Kans.

Filed July 14, 1975, Ser. No. 595,940
Int. Cl.² F16H 23/10
U.S. Cl. 74—60 11 Claims



1. A hydrostatic device to convert rotary to oscillating motion comprising:

a housing:

a rotating drive shaft journaled in the housing;

a rotating cam plate connected to the drive shaft;

an oscillating output shaft mounted in said housing on an axis normal to the axis of the drive shaft;

a rocker arm mounted on the oscillating shaft;

a pair of hydraulic cylinders positioned in driving relation between the rotating cam and the rocker arm, each cylinder is connected to the rocker arm on opposite sides of the oscillating shaft whereby oscillating motion is imparted to the rocker arm by the alternate driving force of each cylinder; and

charging means connected to said cylinders to maintain said cylinders in a continuous charged condition.

3,996,807

CENTRIFUGALLY CONTROLLED TOROIDAL TRANSMISSION

Frederick John Adams, Campton, England, assignor to Cam Gears Limited, Hitchin, England

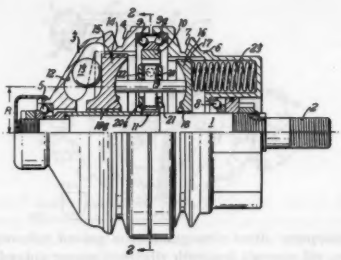
Filed Feb. 26, 1975, Ser. No. 553,445
Claims priority, application United Kingdom, Mar. 5, 1974, 9837/74
Int. Cl.² F16H 15/38
U.S. Cl. 74—190.5 20 Claims

1. A speed control device comprises coaxially mounted, axially displaceable, rotatable driving and driven plates,

a driven housing receiving the driving plate and a driving housing receiving the driven plate, the two housings being axially immovable and coaxially mounted with the two plates, each housing being connected to its associated plate in a manner whereby the associated plate and housing must rotate together but the plates are axially slidable relative to their associated housings,

said driving and driven plates having surfaces defining opposed annular grooves facing each other to define a generally toroidal track therebetween,

at least one roller mounted for rotation with the track, biasing means to bias the plates axially towards the at least one roller and to effect engagement of the surfaces defining the opposed grooves with the at least one roller, the action of the biasing means on at least one of the plates being responsive to the speed of rotation of its associated housing, means pivotably mounting the at least one roller for movement about an axis which is substantially normal to the axis of



rotation of that roller and remote from the radial plane of rotation of that roller whereby, upon axial displacement of at least one of the plates, the roller is pivoted to displace, radially relative to the axis of rotation of the plate, the position of engagement of the at least one roller with the surfaces defining the respective opposed grooves, to effect a change in ratio of angular velocity at which the driving plate is driven relatively to the driven plate.

3,996,808

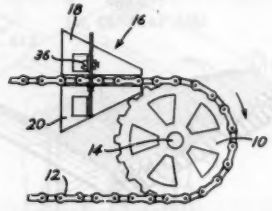
SAFETY LOCK FOR POWER DRIVEN MACHINES

Orville D. Zollman, 893 Hillview Drive, Ashland, Oreg. 97520

Filed July 21, 1975, Ser. No. 597,966

Int. Cl.² F16H 9/00; F16D 63/00

U.S. Cl. 74—217 C **4 Claims**



1. A protective device for preventing possibly dangerous operation of a machine undergoing repairs, which machine is normally driven through a train comprising a rotary member and an endless flexible drive member therefor, said device including opposed clamping blocks at least one of which is wedge-shaped, and means for firmly securing the blocks to one another in clamping relation to the flexible drive member with the tapered end of a wedge-shaped clamping block leading between the flexible drive member and the rotary member driven thereby, the opposed clamping blocks being formed laterally with connecting means through which the blocks may be joined to clamp the flexible drive member firmly between them.

3,996,809

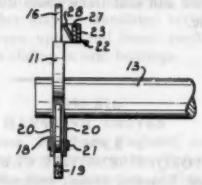
DRIVE CHAIN HAVING A DISENGAGING LINK

Walter L. Miller, Fort Atkinson, Wis., assignor to Butler Manufacturing Company, Kansas City, Mo.

Filed Sept. 26, 1975, Ser. No. 616,924

Int. Cl.² F16H 7/06; F16G 13/06

U.S. Cl. 74—229 **6 Claims**



1. A chain adapted for mounting on a toothed sprocket to move in reciprocating motion, said chain comprising;

a plurality of drive links interconnected with one another, each drive link having means engageable with the sprocket teeth to advance the chain in response to movement of the sprocket; and

a disengaging link connected between selected drive links, said disengaging link including means interacting with the sprocket teeth upon contact therewith to divert the disengaging link off to the side of said teeth, thereby disengaging the chain from said sprocket.

3,996,810

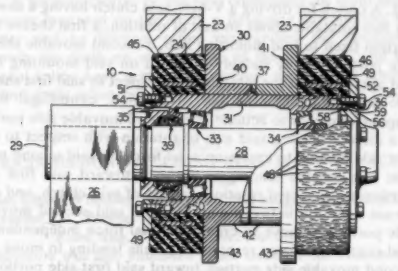
TRACK SUPPORTING ROLLER WITH RESILIENT RIM

Eugene R. Groff, Chillicothe, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Oct. 3, 1975, Ser. No. 619,338

Int. Cl.² B62D 55/14

U.S. Cl. 74—230.3 **3 Claims**



1. A carrier roller for a track-type vehicle for supporting an endless track chain thereof having a pair of laterally spaced track link chain assemblies, each having an inner rail surface, said carrier roller comprising:

a stationary shaft;

a cylindrical hub rotatably journalled about said shaft and having opposite end portions and a center portion intermediate said end portions;

a pair of radially extending flange members mounted about the center portion of the hub in inner lateral guiding relationship between said chain assemblies of the track;

a pair of laterally spaced rims, each mounted about a respective one of said end portions of the hub for track supporting engagement with a respective one of the inner rail surfaces of said track link chain assemblies and having opposite sides with one side thereof abutting a respective one of the flange members;

a pair of flanged retainers, each being detachably mounted to a respective one of the opposite end portions of the hub in clamped engagement against the other side of each of said rims for fixedly clamping the rims between said retainers and said flange members; and

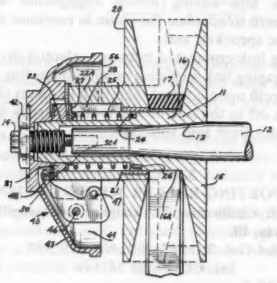
said rims being constructed from a plurality of separate pads of fabric reinforced resilient material for reducing the noise generated by the running engagement between the carrier roller and said track chain during movement of said vehicle.

3,996,811

SPEED AND TORQUE SENSITIVE CLUTCH ASSEMBLY

Gerald D. Reese, Brooten, Minn., assignor to Scorpion, Inc., Crosby, Minn.

Filed Jan. 7, 1974, Ser. No. 431,096
Int. Cl.² F16H 55/52, 55/56
U.S. Cl. 74—230.17 E 9 Claims



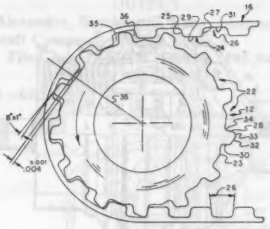
1. A clutch for driving a V-belt, said clutch having a mounting hub rotatable about an axis of rotation, a first sheave side portion fixed to said mounting hub, a second movable sheave side portion axially slidably mounted on said mounting hub, and also mounted for rotation with respect to said first sheave side portion about said axis of rotation, centrifugal force responsive means to actuate said second movable side portion in a direction along said axis of rotation with respect to said first side portion to create an axial force on said second movable side portion tending to move it toward said first side portion at a selected rotational speed of said clutch, and cam means operable between said hub and said second movable side portion to move to create an axial force independent of said centrifugal force responsive means tending to move said second movable side portion toward said first side portion of said sheave upon differential rotational movement between said second and said first sheave side portions occasioned by a tendency of said second movable side portion to rotate about said axis with respect to said first sheave side portion, said cam means comprising a plurality of circumferentially extending ramps fixedly mounted with respect to said hub on an opposite side of said second movable side portion from said first side portion, said ramps extending circumferentially and tapering in a direction along said axis of rotation toward said first side portion as the ramps extend circumferentially and in a rotational direction opposite from the normal direction of rotation of said hub, and tapered ramp surfaces on said second movable portion adpated to engage and slide against said circumferential ramps on said hub portion so that upon differential rotational movement of said second movable side portion and said first side portion in a rotational direction opposite from the direction of rotation of said hub, said second movable portion will be forced in a direction along the axis of rotation of said hub toward said first side portion.

3,996,812

PULLEY

Samuel D. Cappotto, Syracuse, and John E. Dodge, Cortland, both of N.Y., assignors to SCM Corporation, New York, N.Y.

Filed Oct. 20, 1975, Ser. No. 623,690
Int. Cl.² F16G 1/28; F16H 7/00, 55/30
U.S. Cl. 74—231 C 36 Claims



1. A toothed pulley and a belt to be driven thereby for transmitting power, the combination comprising:

means to provide minimal contact between the teeth of the toothed pulley and the belt and

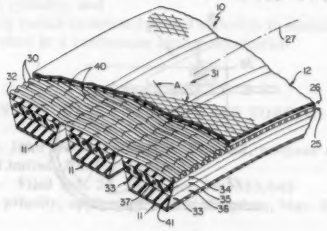
means to provide minimal contact between the tooth valleys of the pulley and the teeth of the belt.

3,996,813

ENDLESS POWER TRANSMISSION BELT

Dewey D. Henderson, and Jack D. White, Jr., both of Springfield, Mo., assignors to Dayco Corporation, Dayton, Ohio

Filed Feb. 13, 1976, Ser. No. 657,911
Int. Cl.² F16G 5/16, 5/00
U.S. Cl. 74—233 20 Claims



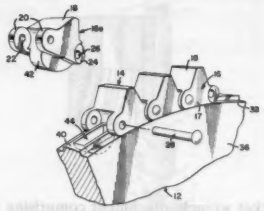
1. An endless power transmission belt for operating in an endless path comprising a plurality of laterally spaced belt elements and a tie band interconnecting said belt elements, said tie band comprising a plurality of cooperating layers, one of said layers comprising a plurality of tensile members arranged in spaced substantially parallel relation along said endless path with each of said tensile members extending across the entire transverse dimension of said tie band and said tensile members providing the strength for holding said belt elements in spaced relation, and another of said layers comprising a fabric layer which improves the overall structural integrity of said tie band.

3,996,814

SPROCKET

Glen Edgar Westlake, 403 Bent Crescent, Richmond Hill, Ontario, Canada

Filed Sept. 13, 1974, Ser. No. 505,555
Int. Cl.² F16H 55/30, 55/12
U.S. Cl. 74—243 DR 6 Claims



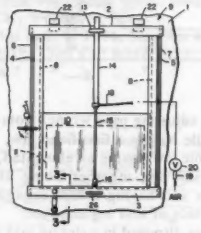
1. A sprocket having interchangeable teeth, comprising:
a hub having means centrally disposed thereon for mounting the hub on a shaft, and having a circumferential outer edge portion;
a plurality of unitary links pivotally connected in series to form an endless chain circumscribing the hub and lying circumferentially against the outer edge portion of the hub, each of said links carrying at least one tooth projecting radially outward with respect to the hub, the chain being disconnectable for removal from the hub;
means to key the chain laterally on the hub, said lateral keying means comprising a recess longitudinally disposed in each of said links on that side of the link lying against the outer edge portion of the hub to form a continuous channel in the chain and an upstanding rib circumferentially disposed on the outer edge portion of the hub, the rib of the hub being received in the channel of the chain; and
means to key the chain longitudinally on the hub.

3,996,815

SAFETY GUARD STRUCTURE

Brooks Walker, 807 Francisco St., San Francisco, Calif. 94109

Continuation-in-part of Ser. No. 467,303, May 6, 1974, Pat. No. 3,913,413. This application June 11, 1975, Ser. No. 586,077.
Int. Cl.² F16P 3/00
U.S. Cl. 74—612 2 Claims



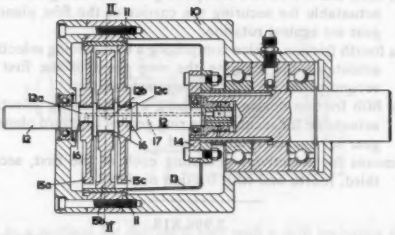
1. A safety guard structure adapted to be interposed in an area between a mechanism and an operator horizontally spaced from said mechanism for protecting said operator, comprising:
a generally rectangular planar guard member (70) having a lower position registering with said area,
a pair of vertically extending elongated rigid guide elements (68, 69),
means (71–74) fixedly securing said guard member to said guide elements at points adjacent the upper and lower horizontally extending side edges of said guard member,
two pairs (63, 65 and 64, 66) of vertically spaced apart fixed bearings, each pair cooperating with one of said elongated guide elements and positioned above said area,
the lower bearing (65, 66) of each of said pair being positioned below the upper means for fixedly securing said guard member to said guide elements, whereby
said guard member may be translated vertically with said elements between upper and lower positions with said guide elements sliding in said bearings.

3,996,816

HARMONIC DRIVES

Derek Keith Brighton, Farnham, England, assignor to The Secretary of State for Defence in Her Britannic Majesty's Government of the United Kingdom of Great Britain and Northern Ireland, London, England

Filed July 31, 1975, Ser. No. 600,830
Claims priority, application United Kingdom, Aug. 1, 1974, 34041/74
Int. Cl.² F16H 33/00, 55/06
U.S. Cl. 74—640 12 Claims



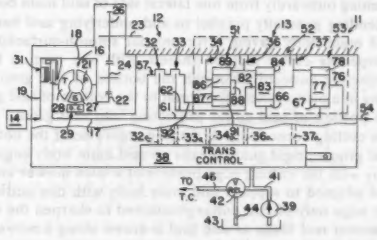
1. A harmonic drive of the type comprising an input shaft, a former mounted on the shaft, a flexspline surrounding the former and an internal spline surrounding the flexspline, wherein the teeth on at least one of the flexspline and the internal spline have a modified involute profile with a small contact angle when fully meshed and considerable tip relief.

3,996,817

TRANSMISSION INCLUDING DUAL INPUT CLUTCH ASSEMBLY

James Elmer Winzeler, East Peoria, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Aug. 27, 1974, Ser. No. 500,945
Disclosure was also published under second Trial Voluntary Protest Program on Feb. 24, 1976
Int. Cl.² F16H 57/10; F16D 19/00
U.S. Cl. 74—765 5 Claims



1. A transmission comprising

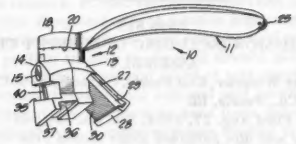
an input shaft,
an output shaft,
first, second and third planetary gear sets each including a sun gear, a ring gear and intermeshing planetary gear means rotatably supported by a carrier, the ring gears of the first and second planetary gear sets being secured for rotation with each other, the ring gear of the third planetary gear set being secured for rotation with the carrier of the second planetary gear set, the carrier of the third planetary gear set being coupled with the output shaft, the input shaft being coupled with the sun gear of the first planetary gear set,
first and second intermediate shafts being arranged in concentric relation with the planetary gear sets, the first intermediate shaft being coupled with the sun gears of the second and third planetary gear sets, the second intermediate shaft being coupled with the carrier of the second planetary gear set and the ring gear of the third planetary gear set,
a first friction device comprising a clutch being selectively actuatable in order to couple the first intermediate shaft for rotation with the input shaft,
a second friction device comprising a clutch being selectively actuatable in order to couple the second intermediate shaft for rotation with the input shaft,
a third friction device comprising a brake being selectively actuatable for securing the carrier of the first planetary gear set against rotation,
a fourth friction device comprising a brake being selectively actuatable for securing the ring gears of the first and second planetary gear sets against rotation,
a fifth friction device comprising a brake being selectively actuatable for securing the ring gear of the third planetary gear set against rotation, and
means for selectively actuating each of the first, second, third, fourth and fifth friction devices.

3,996,818

LAWN MOWER AND GARDEN TOOL SHARPENER

Raymond S. W. Lindsay, 2032 Elkins Place, Arcadia, Calif. 91006

Continuation of Ser. No. 559,759, March 19, 1975, abandoned. This application Feb. 13, 1976, Ser. No. 657,967
Int. Cl.² B21K *19/00*
U.S. Cl. 76—82.1 **12 Claims**



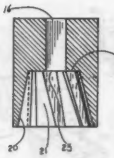
1. A hand-held sharpening tool for sharpening reel type lawn mowers, said tool having a main body provided with an elongated handgrip, a channel-shaped blade seating groove opening outwardly from one lateral side of said main body and extending generally parallel to and underlying said handgrip, said main body having a rectangular smooth-surfaced blade sharpening cutter secured therein with one portion thereof projecting outwardly through the bottom of said groove and lying in a plane generally normal to the bottom of said groove, the portion of said cutter projecting into said groove having one cutting corner edge extending crosswise of the bottom of said groove, rigid guide means on said main body engageable only with the cutting edge portion of a lawn mower knife bar and adapted to support said main body with one cutting corner edge only of said cutter positioned to sharpen the edge of a mower reel blade as said tool is drawn along a mower knife bar undergoing sharpening with said one cutting corner edge of said cutter held pressed crosswise of and against the edge of the mower reel blade.

3,996,819

SOCKET WRENCH ATTACHMENT

James E. King, 805 Bernard Drive, Buffalo Grove, Ill. 60090

Continuation-in-part of Ser. No. 306,153, Nov. 13, 1972, abandoned. This application Jan. 13, 1976, Ser. No. 648,784
Int. Cl.² B25B *13/06*
U.S. Cl. 81—121 R **3 Claims**



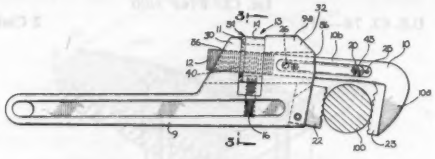
1. A socket wrench attachment comprising a body, a non-circular opening at one end of said body providing means for insertion of a wrench handle drive means, a plurality of flat sides and corners on said body providing drive means for an open end wrench means, a conical opening in the opposite end of said body, and a plurality of separate angularly, rectilinear raised teeth circumferentially spaced on the interior surface of said conical opening, said teeth having a side tilted upward at a slight angle in the direction of rotation of the body and being spaced apart by an arc equal in length to about one-half that of each tooth.

3,996,820

SELF-ADJUSTING PIPE WRENCH

James Larry Tuell, 1240 10th St., Manhattan Beach, Calif. 90266

Filed Oct. 14, 1975, Ser. No. 621,651
Int. Cl.² B25B *13/20*
U.S. Cl. 81—145 **9 Claims**



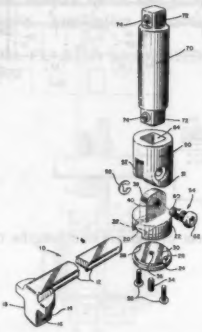
1. An automatic adjusting pipe wrench comprising:
a. a wrench handle having a first fixed jaw;
b. a second slidable jaw having an elongated, wedge shaped leg member, said leg member being coupled to said wrench handle and having a first engaging surface disposed on one side of said leg member;
c. locking member disposed in a slot on said wrench handle, said locking member having a second engaging surface for selectively engaging said first engaging surface on said leg member and retaining said leg member in a predetermined position, said leg member passing through a wedge shaped opening in said locking member; and
d. a return spring coupled to said wrench handle and to said second jaw member such that said second jaw member is encouraged into a closed position when said locking member is disengaged from said leg member.

3,996,821

WRENCH ADAPTER KIT FOR BY-PASSING OBSTRUCTIONS

Charles T. Murray, Woburn, Mass., assignor to TRI Research Corporation, Lynn, Mass.

Filed Apr. 30, 1975, Ser. No. 573,097
Int. Cl.² B25B 13/00
U.S. Cl. 81—177 A 19 Claims



1. A tool kit for use in combination with conventional socket, open-end and box-end wrenches to enable construction of a plurality of special tools configured to by-pass obstructions to reach obscured fasteners, whereby said wrenches may be releasably fixed at any continuous relative angle with respect to other elements of the special tool constructed with said tool kit, said tool kit comprising:

at least one flex adapter having a head with means at one end adapted to engage a standard male socket engaging head, a base with means at one end adapted to releasably and adjustably secure substantially flat, elongated tool handles at any point along the entire length of said tool handles, and means for releasably securing said head to said base at any desired angle continuously through the total included angular limitation of said flex adapter; and

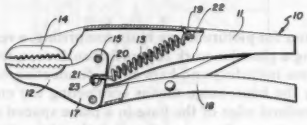
at least one bar extender having a generally flat elongated handle and a standard male socket engaging head at one end thereof, said handle being equivalent in cross section to the handles of a box-end wrench and an open-end wrench and being adapted to be releasably and adjustably secured by said means at said one end of the base of said flex adapter.

3,996,822

SPRING BIASED MOVABLE JAW TOOL

Angelo T. Battista, Worcester, Mass., assignor to Former Manufacturing Co., Worcester, Mass.

Filed Feb. 4, 1976, Ser. No. 655,093
Int. Cl.² B25B 7/12
U.S. Cl. 81—367 10 Claims



1. A tool, comprising

a. a main body,

b. a movable jaw mounted on the main body for pivotal motion about an axis, the jaw having

i. a generally flat face surface perpendicular to the axis,

ii. an edge surface adjacent the face surface,

iii. a keyhole passing through the face surface, the keyhole including an aperture which opens on the face surface but is spaced from the edge surface, and a passage which extends through the face surface and the edge surface and connects the aperture with the edge surface,

c. a wire spring adapted to bias the jaw, the spring having at one end a neck and a head connected to the neck, the head being of such size and shape that it will fit into the aperture but that it will not fit through the passage when it is in at least one position with respect to the aperture, and the neck being of such size and shape as to fit through the passage, the head residing in the aperture and the neck residing in the passage,

d. a maintainer system adapted to keep the head in a position such that it cannot fit through the passage, and

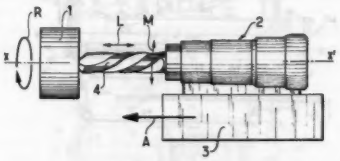
e. a retainer system adapted to keep the head from exiting the aperture at the face surface.

3,996,823

METHOD FOR DRILLING AND TOOL CARRIER FOR BRINGING SUCH A METHOD INTO EFFECT

Bernard Guillermier, Batiment Radar, Route de Vignieres, 74000 le Vieux, France

Filed Dec. 11, 1974, Ser. No. 531,505
Claims priority, application France, Dec. 11, 1973, 73.44190
Int. Cl.² B23B 29/04, 27/22, 43/02
U.S. Cl. 82—1 C 6 Claims



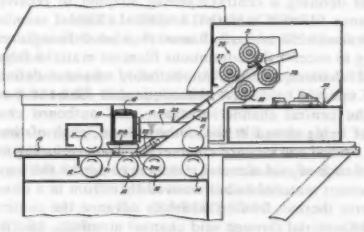
1. In a method for drilling a part with a drill including the steps of rotating the part to be drilled about an axis *xx'* and driving the drill in three movements; a first movement which is an advancing movement along said axis *xx'*, a second movement which is a longitudinal alternating movement along the axis *xx'*, having a period T and slight amplitude in relation to the depth of the hole to be drilled, and a third movement which is a rotating movement about the axis *xx'*; the improvement wherein: said third movement is alternating with a period T and a rotating angle equal to a fraction of a right-angle.

3,996,824

GROOVE CUTTER

Ronald J. Cailey, San Antonio, Tex., assignor to Glass Master Sales and Leasing Corporation, San Antonio, Tex.

Filed Dec. 9, 1974, Ser. No. 523,156
Int. Cl.² B26D 3/06
U.S. Cl. 83—5 2 Claims



1. A blade for a board cutting machine comprising, a section adapted to be attached to a blade support,

a first cutting edge extending from said section toward the board being cut and toward the strip being cut at a slight angle to a plane normal to the board,

a second cutting edge extending from said first cutting edge toward the strip being cut and parallel to the face of the board being cut,

a third cutting edge extending from the second cutting edge toward the board being cut and toward the strip being cut at an angle slightly greater than the angle of said first cutting edge,

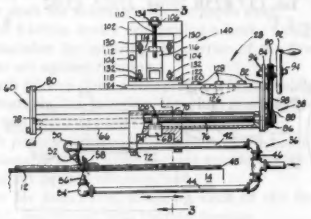
and a fourth cutting edge extending from the third cutting edge toward the strip being cut and parallel to the face of the board being cut.

3,996,825

METHOD AND APPARATUS FOR CUTTING A WEB FIBROUS NON-WOVEN MAT

Rupert Douglas Terry, Toledo, Ohio, assignor to Johns-Manville Corporation, Denver, Colo.

Filed Dec. 18, 1975, Ser. No. 642,093
Int. Cl.² B26F *3/00*
U.S. Cl. 83—53 **12 Claims**



7. A method for cutting or separating a moving non-woven fibrous mat resting on a foraminous surface comprising directing a jet of fluid onto said mat in the area of the desired separation from above said mat, the improvement comprising: simultaneously directing a second jet of fluid upwardly from below said foraminous surface and into the area of separation, the first jet being positioned at an angle from the vertical and such that the jet is directed away from a longitudinal centerline of the mat.

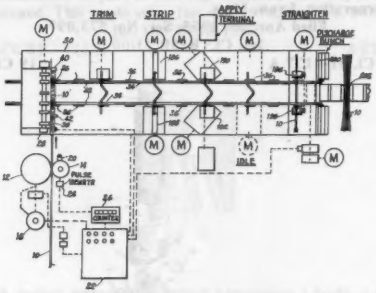
3,996,826

APPARATUS FOR MAKING LENGTHS OF FLEXIBLE MATERIAL

Carl W. McKeever, Kendallville, Ind., assignor to Lyall Electric, Inc., Albion, Ind.

Division of Ser. No. 493,273, July 31, 1974. This application Aug. 27, 1975, Ser. No. 608,097
Int. Cl.² B26D *5/26*
U.S. Cl. 83—208 **8 Claims**

1. A cam head assembly for use in the processing of continuous filament material comprising a flame, an inboard channel member defining a central opening adapted to receive the continuous filament material, a central channel member in alignment with the inboard channel member defining a central opening to receive the continuous filament material from the inboard channel member, an outboard channel defining a central opening to receive the continuous filament material from the central channel member, said outboard channel member being closed at the outboard end, each of the outboard, central and inboard channel members including means to open each of said channel members to permit the continuous filament material to be removed therefrom in a direction transverse thereto, feeding means to advance the continuous filament material through said channel members, said means to advance the material including roller means to intermittently advance the filament material and cutting means positioned adjacent to the inboard channel member to cut the continuous filament material extending into each of the channel members to form predetermined lengths of the filament material.

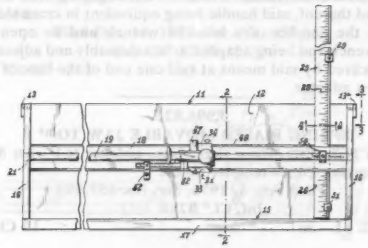


3,996,827

CUTTER FOR MATS

Malcolm Logan, 284 Shady Drive, Palatine, Ill. 60067

Filed Aug. 25, 1975, Ser. No. 607,286
Int. Cl.² B26D *7/02*
U.S. Cl. 83—455 **11 Claims**



1. A cutter for picture frame mats comprising, a rectangular base having a planular work supporting surface, a rectangular clamp frame including end bars and a connecting handle bar carried by the base, hinge means connecting the end bars to one longitudinal edge of the base in a plane spaced above the work supporting surface so as to allow the clamp frame to lie flat against the base, a cutter bar journalled intermediate the ends of and bridging the space between said end bars, said cutter bar having parallel longitudinal edges, one of said edges forming an acute angle to the plane of the cutter bar and the other forming a right angle to said plane, a cutter head slidable along said cutter bar, and a pair of cutting blades movably carried by the cutter head one disposed for cooperation with each longitudinal edge of the cutter bar.

3,996,828

DEVICE FOR CUTTING LONGITUDINAL STRIPS FROM REELS OF MATERIALS IN STRIP OR FOIL OR SHEET OR SIMILAR FORM OR OF REDUCED THICKNESS

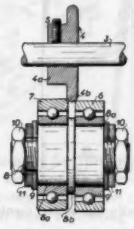
Maurice Granger, 28 rue Charles de Gaulle, 42000 Saint-Etienne-Loire, France; André Lerond, 174 rue Léon Blum, 69100 Villeurbanne-Rhone, France, and Olivier Failliot, Rochefort en Yvelines, Yvelines, France

Filed Apr. 15, 1975, Ser. No. 568,370

Claims priority, application France, Apr. 16, 1974, 74.13968

Int. Cl.² B23D *19/06*; B26D *1/28*

U.S. Cl. 83—500 11 Claims



1. A device for cutting longitudinal strips from reels of materials in sheet form of reduced thickness, said device comprising a frame, a shaft rotatably mounted in said frame, a disc secured to said shaft for rotation therewith, said disc having an annular peripheral surface which in transverse section has a rounded profile, an arm pivotably connected to said frame, a rotatable member mounted on said arm, means acting on said arm for urging said rotatable member into contact with the peripheral surface of the disc, said rotatable member having two cylindrical bearing surfaces separated from one another and disposed in different planes for contacting said rounded profile of the peripheral surface at spaced locations on said rounded profile, and means for feeding the material to be cut between the disc and the rotatable member.

3,996,829

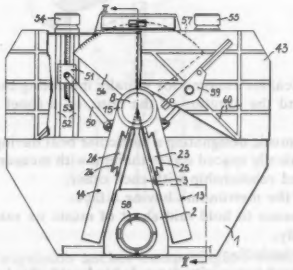
ANGULAR SHEARING MACHINE FOR LAMINATES, SUCH AS SHEET METAL

Gianfranco Tromponi, Via Bazzecca, 4, Bologna, Italy

Filed Feb. 23, 1976, Ser. No. 660,544

Int. Cl.² B26D *7/26*

U.S. Cl. 83—522 4 Claims



1. An adjustable cutting angle shearing machine for laminates characterized in that it comprises a pair of shoulders extending in vertical planes and having a first upper horizontal portion and a second lower horizontal portion connected to each other by a third portion such as to define a substantially C-like shape, said horizontal portion having the ends hinged to a supporting frame along a vertical axis, wherein the upper horizontal portions are provided with guides extending parallel to the shoulder hinge axis for the sliding movement of respective movable cutter supporting plates whereon the cutters are arranged so as to define an angle the apex whereof is aligned with said hinge axis, said movable cutters cooperating with fixed cutters attached to the lower portions and substantially coplanar with a backing plate surface for the laminate being sheared, and wherein an actuating means is provided for lowering and raising the movable cutter supporting plates and an angular position adjusting means for said shoulders.

3,996,830

STAMPING DEVICE WITH VERTICALLY GUIDED FRAME

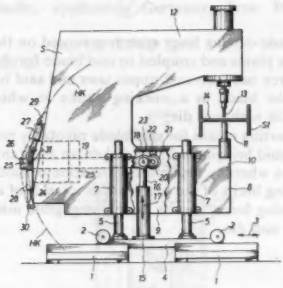
Werner Peddinghaus, Sprockhovel, and Ludwig Regenbrecht, Gevelsberg, both of Germany, assignors to Rolf Peddinghaus, Bruchhausen, Germany

Filed Aug. 20, 1974, Ser. No. 498,915

Claims priority, application Germany, Aug. 21, 1973, 2342074

Int. Cl.² B26D *5/08*

U.S. Cl. 83—558 8 Claims



1. A stamping device, which includes: vertically reciprocable frame means comprising means supporting a stamping punch and also comprising means for receiving thereon a workpiece to be punched, a bottom plate, fluid operable cylinder-piston means mounted on said bottom plate, two-arm lever means pivotally connected to said cylinder-piston means and comprising a shorter arm supporting said frame means and also comprising a longer arm having a free end portion, balancing weight means adjustable on said longer arm in the longitudinal direction thereof and compensating and cushioning spring means having one end connected to said frame means and an opposite end connected to the free end portion of said longer arm.

3,996,831

METAL SHEARING MACHINE

Wilfred Ernest Gale, 5, Stream Park, East Grinstead, Sussex, England

Continuation-in-part of Ser. No. 396,188, Sept. 11, 1973, Pat. No. 3,851,553. This application Apr. 24, 1974, Ser. No. 463,554

Claims priority, application United Kingdom, May 7, 1973, 21635/73

The portion of the term of this patent subsequent to Dec. 3, 1991, has been disclaimed.

Int. Cl.² B26D *5/18*

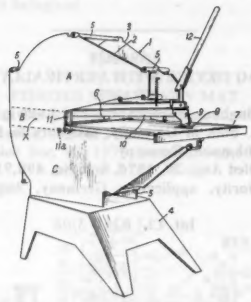
U.S. Cl. 83—589 3 Claims

1. A metal shearing machine comprising:

i. a body composed of two substantially C-shaped plates

each including an elongate lower jaw, an elongate upper jaw, and a bridging portion, said lower and upper jaws being joined at one end by said bridging portion and being spaced apart for the remainder of their length so as to define a throat which is open at its end remote from said bridging portion, said plates being disposed in spaced relationship with the jaw areas of the respective plates converging towards each other towards their free end;

ii. a die carried by the lower jaws of the plates at a position adjacent to the open end of the throat;



iii. a blade-driving lever system mounted on the upper jaws of the plates and coupled to said blade for the application of force between said upper jaws and said blade for driving the blade in a working stroke in which the blade co-acts with said die;

v. supporting means for said blade pivotably mounted selectively on said bridging portion and on an adjacent zone of said lower jaws whereby resilient deformation of said body within the working limits of the machine, as a result of application of blade driving force, results in only negligible misalignment of the blade and die.

3,996,832

PUNCH FOR PRODUCING HOLES IN FOAMED THERMOPLASTIC CONTAINERS

John C. Schubert, Chippewa Falls, and Charles B. Case, Eau Claire, both of Wis., assignors to Standard Oil Company (Indiana), Chicago, Ill.

Filed Apr. 10, 1975, Ser. No. 566,957

Int. Cl.² B26F *1/14*

U.S. Cl. 83—686 **1 Claim**

1. A hole punch for use in the production of foamed thermoplastic containers comprising a generally concave blade edge with a reverse curvature near each edge of the blade, said

blade edge having generally the same contour as the surface into which it is punched.

3,996,833

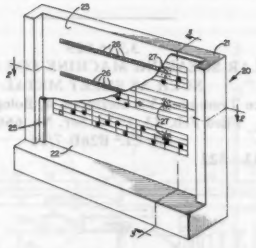
OPTICAL METRONOME

Juan M. del Castillo, Risco No. 119, Mexico City 20, Mexico

Filed July 8, 1975, Ser. No. 594,092

Int. Cl.² G10B *15/00*

U.S. Cl. 84—484 **17 Claims**



1. An optical metronome for visually indicating the note to be played and the duration of the note, on a sheet of music comprising

a sheet of music designating a particular beat having parallel and vertically spaced staves thereon with measures drawn for timed relationship with each other,

a body of the metronome having a face,

holding means to hold said sheet of music on said face of said body,

said body including

an area of luminosity from behind said sheet of music visible therethrough with means to form said area of luminosity and space successive areas of luminosity relative to spacing of notes on said sheet of music, and

means to move said area of luminosity in timed relation to the tempo of the music being played from said sheet of music along said staves on said sheet of music.

3,996,834

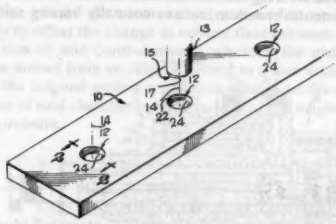
FASTENING ELEMENT

Richard L. Reynolds, Palos Verdes, Calif., assignor to Litton Systems, Inc., Beverly Hills, Calif.

Continuation-in-part of Ser. No. 458,235, April 5, 1974, abandoned. This application Sept. 17, 1975, Ser. No. 614,197

Int. Cl.² F16B *37/00*

U.S. Cl. 85—32 V 20 Claims



1. A fastening element for forming a fastener assembly by engagement with a self-tapping screw comprising:

a. a solid body having a threadless cylindrical surface developing a circular bore extending into said solid body and defining a longitudinally extending axis,

b. at least one elliptical rib protruding radially inwardly into said bore along an elliptical close-loop line upon said cylindrical surface of said bore,

c. two turning points of reversal in axial direction component in said closed-loop line defining a maximum and minimum in axial extent of said elliptical rib,

d. a rising rib portion in said elliptical rib extending from said minimum axial extent and a descending rib portion extending from said maximum axial extent, and

e. at least a portion of at least one interruption of said elliptical rib in said rising rib portion on said closed-loop line so that at least one void is developed by said interruption in said elliptical rib.

3,996,835

EXPANSION ANCHOR

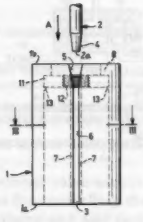
Franz Chromy, Feldkirch-Levis, Austria, assignor to Hilti Aktiengesellschaft, Schaan, Liechtenstein

Filed Mar. 11, 1975, Ser. No. 557,317

Claims priority, application Germany, Mar. 18, 1974, 2412901

Int. Cl.² F16B *13/04*

U.S. Cl. 85—79 12 Claims



1. An expansion anchor comprising an axially extending expansion sleeve having a leading end and a trailing end with the leading end arranged to be inserted into a hole prepared to receive the expansion sleeve, said sleeve having an inside surface and an outside surface, said sleeve having a slot extending between the inside and outside surfaces and from the leading end to the trailing end with the slot disposed in parallel relation with the axis of the sleeve, said slot having a constant dimension measured in the circumferential direction of the sleeve for at least a major portion of the axial length of the sleeve from its leading end towards its trailing end, and an expanding body displaceably engageable through said slot for expanding said sleeve, wherein the improvement comprises that said expanding body is an axially extending pin having an axially extending cylindrically shaped portion, and the cylindrically shaped portion of said expansion body has a diametrical dimension greater than the dimension of said slot measured in the circumferential direction of said sleeve prior to the expansion of said sleeve by the cylindrically shaped portion of said expanding body, said cylindrically shaped portion being axially displaceable through the length of said slot from the leading end to the trailing end thereof for increasing the diameter of the outside surface of said sleeve and expanding the outside surface of said sleeve into contacting engagement with a hole prepared to receive the expansion sleeve.

3,996,836

APPARATUS FOR TRANSPORTING AND CHARGING UNCARTRIDGED EXPLOSIVES, MORE PARTICULARLY PLASTIC EXPLOSIVES

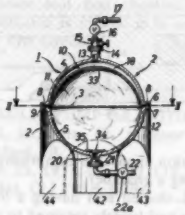
Hubert Lichtenberg, Dortmund-Lottringhausen, Germany, assignor to Dynamit Nobel Aktiengesellschaft, Troisdorf, Germany

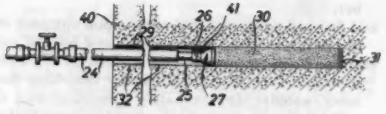
Filed May 5, 1975, Ser. No. 574,747

Claims priority, application Germany, June 26, 1974, 2430632

Int. Cl.² C06D *5/04*

U.S. Cl. 86—20 C 2 Claims





1. Apparatus for transporting uncartridged flowable explosive to its place of use, and for charging blast holes comprising

A. a spherical container divided into two hemispheres, each hemisphere containing a pole, the container being separable upon a substantially equatorial line into the two hemispheres which define walls of a pressure chamber and an explosive supply chamber respectively,

B. a displacer within said spherical container and confined between said hemispheres to define a boundary between the pressure chamber and the supply chamber and consisting of elastomeric material,

C. a thickened enlargement of said displacer substantially in the middle thereof,

D. a valve-controlled first spigot in the region of the pole of the hemisphere which defines walls of the pressure chamber,

E. means for introducing an incompressible pressure fluid through the first spigot into the pressure chamber for flexing said displacer,

F. an explosive outlet second spigot at the pole of the hemi-

sphere which defines the walls of the explosive supply chamber,

G. an aperatured bearing disc on the inside of said pressure chamber aligned with the first spigot and against which said thickened enlargement is adapted to bear,

H. a nozzle for extending into a blast hole for delivering explosive thereto,

I. an explosive conveying hose which has an opening on one end connected to the second spigot and an opening at the other end connected to the nozzle and is completely closed elsewhere for exclusively conveying the contents of the explosive supply chamber to and through the nozzle, and

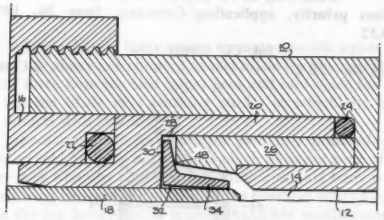
J. a seal on the end of said nozzle for militating against the flow of any material conveyed by the hose back past the nozzle into the unfilled region of the bore hole.

3,996,837

SEAL

Eugene Ashley, Burlington, and Douglas P. Tassie, St. George, both of Vt., assignors to General Electric Company, Burlington, Vt.

Filed May 8, 1975, Ser. No. 575,752
Int. Cl.² F41D *11/00*
U.S. Cl. 89—26 **4 Claims**



1. A combustion apparatus comprising:

a vessel having a chamber;

an annular, L-shaped seal having a longitudinal bore and disposed in and loosely retained to said chamber;

a piston having a forward portion with a cylindrical external face disposed for reciprocation into and out of said chamber;

said forward portion of said piston upon entrance into said chamber passing entirely through said bore of said seal;

said seal being transversely annular and having a heel with a portion extending longitudinally therefrom having an inner, annular, approximately cylindrical face defining said bore and a portion extending transversely therefrom having an aft, annular approximately transverse face;

said inner face having a forward-most annular edge remote from said heel which is in the free state of said seal is less in internal diameter than the remainder of said inner face, and which in the free state is less than the external diameter of said forward portion of said piston; and

said chamber having an annular recess therein into which said transversely extending portion of said seal is captured but has limited freedom of transverse movement.

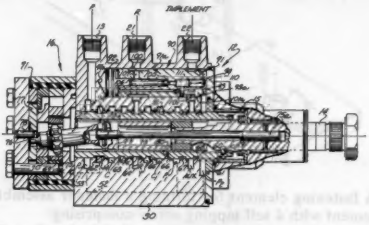
3,996,838

DIVERTER VALVE FOR POWER STEERING WITH POWER BEYOND

Raymon L. Goff, Lafayette, Ind., assignor to TRW Inc., Cleveland, Ohio

Filed June 4, 1975, Ser. No. 583,591
Int. Cl.² F15B *13/04*
U.S. Cl. 91—32 **7 Claims**

1. Apparatus for use in a vehicle having a steering mechanism and comprising a housing, said housing including a fluid inlet port, a fluid return port and an auxiliary port for fluid connection with an implement, a first valve movably located within said housing and having a neutral position communicating the inlet port to the auxiliary port, said first valve having first and second operative positions communicating said inlet with the steering mechanism to effect steering in different respective directions and said valve progressively restricting communication from the inlet port to the auxiliary port and progressively increasing communication between the inlet port and the steering mechanism as said first valve is moved from said neutral position, means normally biasing said first



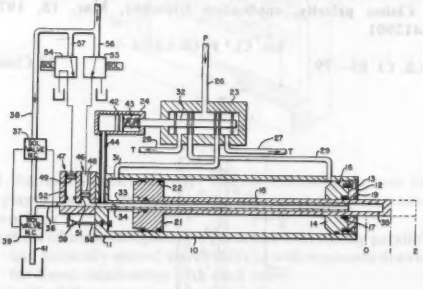
valve to the neutral position, a valve actuator operatively associated with said valve for moving said valve from the neutral position to the operative positions, and a second valve in said housing for communicating fluid to said auxiliary port from said inlet port when said first valve blocks fluid flow to said auxiliary port and pressure exists for actuating the implement, said second valve comprising a valve element movable in a bore in said housing, said housing defining a chamber in communication with said fluid inlet port, said valve element having surfaces against which the pressure in said chamber acts, and said valve being movable to communicate the pressure in said chamber with said auxiliary port.

3,996,839

HYDRAULIC POSITIONING CYLINDER

Glen A. Norwood, 710 Maplewood Ave., Kent, Wash. 98031

Filed May 23, 1973, Ser. No. 354,185
Int. Cl.² F15B *13/16, 17/02*; F01B *31/00*
U.S. Cl. 91—388 **7 Claims**



1. In a hydraulic system including a power cylinder having double acting piston means, and servo-valve means for applying fluid pressure to said power cylinder to produce movement of said piston means, the combination therewith of a servo-control system for controlling the position of said piston means, the servo-control system comprising; control fluid conduit means cooperating with said piston means for forming a fluid chamber adapted to contain a fixed volume of control fluid and for varying the pressure of said control fluid by

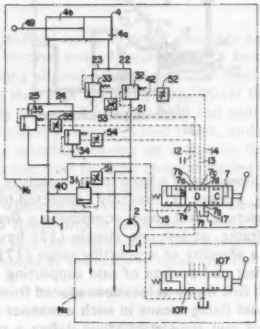
varying the volume of said chamber in response to movement of said piston means, control means in communication with said chamber for selectively varying the pressure of said control fluid from an original pressure by varying the volume of said chamber independently of said piston means, and fluid pressure responsive sensing means connected to said control fluid conduit means and to said servovalve means for operating the servo-valve means in response to changes in the pressure of the control fluid to produce such movement of said piston means that the associated change in volume of said chamber causes the control fluid pressure to change sufficiently to offset the change in control fluid pressure caused by operation of said control means, whereby the piston means will be moved from an original setting to a new setting spaced from the original setting a distance related to the change in volume of said chamber needed to restore the original control fluid pressure.

3,996,840

CONTROL CIRCUIT OF ACTUATOR

Masayuki Futamata, Tokyo, and Hidenori Sato, Inagi, both of Japan, assignors to Kabushiki Kaisha Komatsu Seisakusho, Tokyo, Japan

Filed July 23, 1974, Ser. No. 491,112
Claims priority, application Japan, July 24, 1973, 48-82706
Int. Cl.[2] F04B *21/00*
U.S. Cl. 91—457 **3 Claims**



1. A hydraulic control circuit for a hydraulic actuator comprising a cylinder and a piston, said cylinder having a first and second chamber separated by said piston, said circuit comprising:

a. a pump;

b. a tank;

c. first conduit means connecting said first chamber and said pump;

d. second conduit means connecting said first chamber and said tank;

e. third conduit means connecting said second chamber and said pump;

f. fourth conduit means connecting said second chamber and said tank;

g. first pilot operated valve means connected in said first conduit means for controlling the flow of hydraulic fluid between said pump and said first chamber;

h. second pilot operated valve means connected in said second conduit means for controlling the flow of hydraulic fluid between said first chamber and said tank;

i. third pilot operated valve means connected in said third conduit means for controlling the flow of hydraulic fluid between said pump and said second chamber;

j. fourth pilot operated valve means connected in said fourth conduit means for controlling the flow of hydraulic fluid between said second chamber and said tank;

wherein said first, second, third and fourth pilot operated valve means each comprise a valve body, a pressure chamber within said valve body, said pressure chamber having a valve seat therein, wherein the diameter of said valve seat is the same as the diameter of said pressure chamber, first spool means positioned in said pressure chamber, said first spool means having a valve seat thereon for engaging the valve seat in said pressure chamber, and biasing means for biasing said valve seats into engagement; and

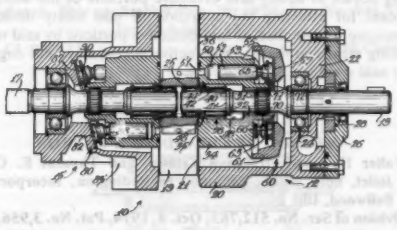
k. pilot valve means coupled to said first, second, third and fourth pilot operated valve means, said pilot valve means comprising a valve body having a plurality of ports therein, and second spool means within said valve body, wherein said plurality of ports in the body of said pilot valve means comprises a first port coupled to said first pilot operated valve means, a second port coupled to said second pilot operated valve means, a third port coupled to said third pilot operated valve means, a fourth port coupled to said fourth pilot operated valve means, and a fifth port coupled to said tank, and wherein said spool has at least one hollow chamber therein and a plurality of hole means for coupling predetermined ones of said ports to said hollow chamber, said second spool means having a first position for operating said first, second, third and fourth pilot operated valve means such that hydraulic fluid flows from said pump to said first chamber and from said second chamber to said tank, and when said actuator is moved in a first direction, and said second spool means has a second position for operating said first, second, third and fourth pilot operated valve means such that hydraulic fluid flows from said pump to said second chamber and from said first chamber to said tank, whereby said actuator is moved in a second direction opposite to said first direction.

3,996,841

HYDRAULIC PUMP OR MOTOR

Victor G. Gostomski, Jr., Peru, Ill., assignor to Sundstrand Corporation, Rockford, Ill.

Filed Feb. 23, 1971, Ser. No. 118,101
Int. Cl.[2] F01B *13/04*
U.S. Cl. 91—499 **2 Claims**



1. A hydraulic energy translating device comprising: housing means, valve means in said housing means having inlet and discharge ports, a cylinder block rotatable relative to said valve means and having axial cylinders serially communicable with the inlet and discharge ports, pistons slidable in said cylinders, said pistons having bearing slippers pivotally mounted on the ends thereof, an inclinded cam plate at one end of the cylinder block for reciprocating said pistons in the cylinder block including a relatively rough supporting surface, and a thin flat thrust plate of resiliently flexible spring steel material loosely mounted on said supporting surface having a bearing slipper engaging surface on the side of the thin plate facing away from said rough supporting surface, said bearing slipper engaging surface being substantially smoother than said rough supporting surface, said thrust plate being sufficiently thin to resiliently deform against said rough supporting

surface under normal hydraulic pressure of the device without undue stress in the thrust plate.

3,996,842

APPARATUS FOR REDUCING AND EQUALIZING LOCALIZED STRESSES IN RUNNING PAPER WEBS OR THE LIKE

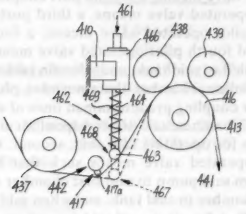
Klaus-Dieter Ehlich, and Heinz-Christen Lorenzen, both of Hamburg, Germany, assignors to Hauni-Werke Korber & Co., KG, Hamburg, Germany

Filed Apr. 17, 1975, Ser. No. 569,195

Claims priority, application Germany, May 3, 1974, 2421394; Jan. 1, 1975, 2500955

Int. Cl.² B31F 7/00

U.S. Cl. 93—1 R **16 Claims**



1. Apparatus for manipulating an elongated flexible web having spaced-apart defective portions, particularly a web which is being withdrawn from a bobbin and is utilized in the manufacture or processing of smokers' products, comprising means for advancing the web lengthwise along a predetermined path, a supporting device adjacent to one side of said path; at least one curling device mounted in said supporting device and having an elongated web engaging member extending substantially transversely of said path and normally engaging one side of the web so that successive increments of the web are flexed as a result of engagement with said member; a safety device actuatable to disengage the web from said curling device; and control means for actuating said safety device, comprising means for monitoring the web ahead of said curling device to detect said defective portions of the web, and means for effecting the actuation of said safety device in response to detection of said defective portions by said monitoring means so that such defective portions are not engaged by said member.

3,996,843

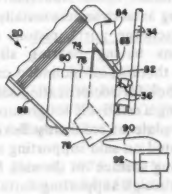
METHOD OF EXPANDING A CARTON

Walter H. Vogel, Hoffman Estates, and Thomas E. Close, Joliet, both of Ill., assignors to Redington, Incorporated, Bellwood, Ill.

Division of Ser. No. 512,763, Oct. 4, 1974, Pat. No. 3,956,976. This application Dec. 22, 1975, Ser. No. 643,218

Int. Cl.² B31B 1/76

U.S. Cl. 93—53 M **2 Claims**



1. A method of expanding a collapsed carton and spreading the flaps of at least one end of said carton, the flaps of said carton, when it is in the collapsed state, lie in the same plane as the sides of the carton from which they extend and while said carton is in the collapsed state, said flaps comprise a first side flap, a second side flap and a front flap including a tuck flap, said front flap extending beyond said side flaps and lying in the same plane as said first side flap, said method comprises:

a. partially expanding said carton;

b. closing said front flap while said carton is partially expanded and thereby spreading said second flap outwardly;

c. holding said second flap open while spreading said first and front flaps outwardly by applying pressure from the inside surfaces thereof; and

d. fully expanding said carton while holding said first, second and front flaps in their spread position.

3,996,844

OPENING SKYLIGHT OF GREAT STABILITY

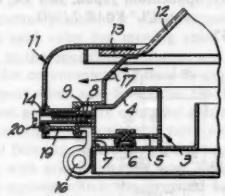
Ghislain Leurent, 23 Avenue de la Marne Tourcoing, Tourcoing, France

Filed July 25, 1975, Ser. No. 598,927

Claims priority, application Belgium, July 30, 1974, 53776

Int. Cl.² F24F 7/02

U.S. Cl. 98—42 R **2 Claims**



1. Skylight consisting of a fixed frame structure (1) delimiting an opening, a cover (2) hingedly connected to one side of said frame structure, said cover comprising a first (4) and a second (11) frame, at last one cupola (12) havng an edge portion (13), a plurality of supporting strips (17), and fixing means (20), first end portion of said supporting strips being secured to said first frame at locations spaced from each other by means of said fixing means in such a manner that second end portions of said supporting strips define a structure for supporting said edge portion of said cupola at a predetermined distance from said first frame and first end portions of said second frame being secured to said frame by means of said fixing means in such a manner that said first end portions of said second frame are located at a distance from said first frame and that second end portions of said second frame make contact with the upper surface of said edge portion whereby a continuously open air passage is provided by said distance between the first and second frames.

3,996,845

AIR HANDLING GRILLE AND METHOD OF MAKING THE SAME

William J. Harris, Tunkhannock, Pa., assignor to Anemostat Products Division, Dynamics Corporation of America, Scranton, Pa.

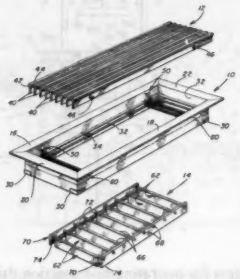
Filed July 16, 1975, Ser. No. 596,268

Int. Cl.² F24F 13/14

U.S. Cl. 98—114 **16 Claims**

1. An air handling grille comprising an open rectangular frame adapted to be mounted in an aperture for the passage of air therethrough, said frame having a pair of opposing parallel end sections and a pair of opposing parallel side sections, each section of at least one of said pairs of sections having an inwardly open longitudinally extending groove defined therein, said two grooves being in parallel opposing relation-

ship across the frame opening, and at least one of said grooves having a narrow inwardly projecting flange extending along and defining one longitudinal edge thereof, a spaced parallel series of similar elongated air directing vanes each adapted for adjustment about an axis extending longitudinally thereof and each having similar oppositely projecting bearing studs with axes substantially coincident with said adjustment axis, the overall longitudinal dimension of each of said vanes including its opposite bearing studs being less than the distance between the inner edge of said flange and the base of the opposite groove, a pair of similar elongated resilient bearing members spaced apart in parallel relationship and disposed respectively in said grooves, each of said bearing members being provided



with a longitudinal series of small openings each adapted to frictionally receive and adjustably hold a bearing stud, said openings being aligned across said frame opening and opposite studs of the vanes being frictionally held therein whereby to adjustably secure all of said vanes and said bearing members in assembled positions in said frame, and at least one of said bearing members having an integrally formed latching element thereon, said latching element having a free position projecting generally longitudinally outwardly with respect to said vanes whereby to extend outwardly beyond said inner edge of said flange and to latch said bearing member in said groove, and said latching element also being deflectable generally longitudinally inwardly to clear said flange inner edge.

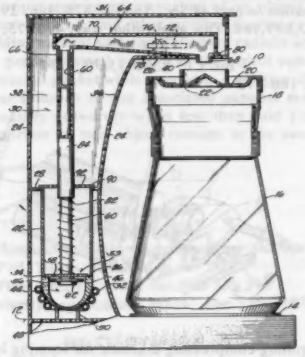
3,996,846

COFFEE MAKER WITH IMPROVED HOT WATER PUMP

Charles J. Hupf, Kewaskum, Wis., assignor to Regal Ware, Inc., Kewaskum, Wis.

Filed Dec. 3, 1975, Ser. No. 637,254
Int. Cl.² A47J *31/057*
U.S. Cl. 99—307 **10 Claims**

1. In a coffee maker having a housing, a coffee pot stand supported by a portion of said housing, and a water reservoir formed by a portion of said housing, an improved hot water pump comprising means forming a water heating chamber within said housing, means coupling said water heating chamber to said water reservoir, means for heating the water in said water heating chamber to the boiling temperature thereof, a substantially vertical hot water lift tube extending upwardly from said water heating chamber on one side of said coffee pot stand, a check valve between said water reservoir and said heating chamber to permit entry of water into said heating chamber through said check valve and to prevent exit of water from said heating chamber through said check valve, whereby vapor pressure in said water heating chamber will force hot water up said vertical hot water lift tube in periodic spurts, a substantially horizontal hot water transfer conduit coupled to the top of said hot water lift tube and extending transversely therefrom over said coffee pot stand for conveying said hot water to a location above said coffee pot stand, a water outlet opening on the end of said transfer conduit above said coffee pot stand, means removably connecting said transfer conduit to said housing at a location intermediate the ends of said transfer conduit, and spring means surrounding said vertical hot water lift tube and bearing on the end of said horizontal



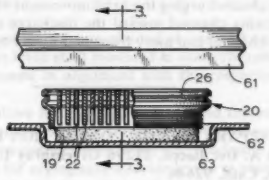
hot water transfer conduit which is coupled to said vertical hot water lift tube for applying pressure to the removable connection between said transfer conduit and said housing to removably lock said transfer conduit to said housing.

3,996,847

APPARATUS FOR HEATING FOOD PRODUCTS

Claude A. Reed, Omaha, Nebr., assignor to Reed Development, Inc., Omaha, Nebr.

Continuation-in-part of Ser. No. 190,254, Oct. 18, 1971, abandoned. This application Feb. 28, 1974, Ser. No. 446,951
Int. Cl.³ A47J *37/06*
U.S. Cl. 99—419 **10 Claims**



1. An appliance for heating a food patty, and which is adapted to cook ground meat, comprising:

a plurality of projecting grill means mounted in an array for insertion into one side of such food patty;

said projecting grill means being of sufficient length to penetrate such food patty from the one side to at least about adjacent the opposite side of such patty;

a plurality of heat transfer fin means thermally connected to said plurality of grill means so that substantial amounts of the heat energy imparted thereto are transmitted to said grill means so as to heat the food patty internally; and

ejection means adapted to be associated with said projecting grill means for removing the food patty from the grill means following the cooking operation.

3,996,848

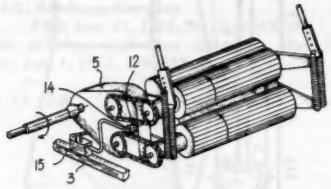
ROTARY COMPACTING MACHINE FOR FIBROUS MATERIAL

Joseph Molitorisz, 624 81st Ave., NE., Bellevue, Wash. 98004

Continuation-in-part of Ser. No. 327,678, Jan. 29, 1973, Pat. No. 3,899,964. This application Aug. 4, 1975, Ser. No. 601,821

Int. Cl.² B30B *15/30, 3/04*

U.S. Cl. 100—73 **3 Claims**



1. A rolling-compressing machine for forming loose fibrous material, such as hay, into a dense cylindrical core which is cut into individual rolls, comprising: a roller system of a core forming channel, said core forming channel confined by and having a plurality of at least four circumferentially spaced skewed power driven compression rollers, an applicator apparatus for injecting or depositing chemical preservatives into the core of fibrous material as it is being formed in the core forming channel, the compression rollers being power driven and flexible supported by a power transmission gear box, said power transmission gear box being allowed to make limited and adjustable rotational movement about its supporting axis and being urged by its own weight and by an adjustable biasing means into a position where said compression rollers are skewed relative to said core forming channel urging the axial movement of said core in said core forming channel toward the power transmission gear box and away from the discharge end of said core forming channel, said power transmission gear box having a power input shaft, said power input shaft exerting a torque urging said power transmission gear box to rotate in a direction opposite to the torque exerted by the own weight of said power transmission gear box, and by an adjustable biasing means, when the magnitude of the torque applied at the power input shaft is greater, said rotational movement of said power transmission gear box causing the skewed arrangement of said compression rollers relative to said core forming channel urging the axial movement of said core in the core forming channel toward the discharge end of said core forming channel and away from said power transmission gear box.

3,996,849

APPARATUS FOR COMPACTION BALING

Nicholas A. Del Jiacco, 21296 Greenspray Lane, Huntington Beach, Calif. 92646

Filed Mar. 1, 1973, Ser. No. 482,138

Int. Cl.² B30B *15/32, 9/32, 1/32*

U.S. Cl. 100—218 **4 Claims**

1. A baler for compressing compactable material into bales, comprising

a vertically disposed cavity defined by a structurally reinforced box, said cavity being open at the top;

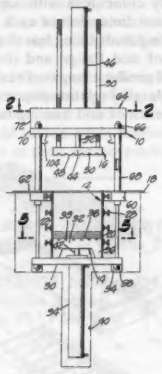
an ejection platen sized to fit within said cavity;

ejection drive means extending below said cavity for driving said ejection platen vertically in said cavity between a position at the bottom of said cavity and a position just above the top of said cavity;

a frame, said frame being fixed relative to said cavity;

a compression platen sized to fit within said cavity, said compression platen being disposed opposite said ejection platen;

compression drive means fixed to said frame above said cavity for driving said compression platen vertically between a position displaced from said cavity for access to said cavity and a position near the bottom of said cavity for compressing compactable material against said ejection platen; and



a control system for operating said ejection drive means and said compression drive means, said control system providing a constant force device operably connected to said compression drive means to allow said ejection drive means to eject said bale while maintaining a preselected pressure on said bale through said compression drive means.

3,996,850

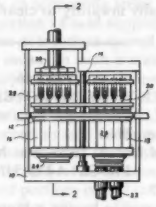
COTTON GIN PRESS DOGS

Rufus A. Whitener, P.O. Box 219, Wolfforth, Tex. 79382

Filed July 31, 1975, Ser. No. 600,878

Int. Cl.² B30B *15/00*

U.S. Cl. 100—220 **2 Claims**



1. In a cotton gin press box having:

a. a turntable,

b. two diametrically opposed boxes on the turntable,

c. tramper means over one of the boxes for tramping cotton downward therein,

d. press means under the other of the boxes for compressing cotton upward therein, and

e. said turntable rotatable so that the boxes may be interchanged,

f. the improved structure for holding the cotton down as tramped comprising:

g. two ears attached to the outside of the box,

h. an anvil pivoted between the ears,

j. at least one spring extending from the anvil to the box urging the anvil upward,

k. a stop on the anvil for limiting the upward travel,

m. a dog

n. pivoted to the anvil,

o. the dog having a finger extending into the box for holding the cotton down, and

p. the dog having a weight bearing against the anvil outside the box.

3,996,851

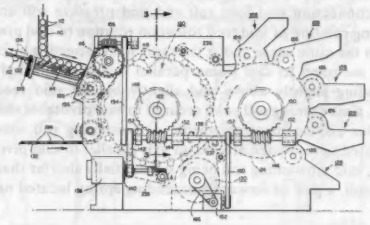
CONTAINER PRINTING APPARATUS

Joseph J. Urban, Pleasantville, N.Y., assignor to Crown Cork & Seal Company, Inc., Philadelphia, Pa.

Filed July 17, 1975, Ser. No. 596,649

Int. Cl.[2] B41F *17/08*

U.S. Cl. 101—40 8 Claims



1. Apparatus for coating objects having exterior surfaces of revolution comprising:

a mandrel drum adapted to rotate about the axis thereof;

a mandrel cam;

a plurality of mandrel support means mounted in a plurality of angular positions about said mandrel drum, each of said mandrel support means including a cam follower and load means for urging said cam follower radially outwardly toward said mandrel cam;

a plurality of mandrels mounted on ones of said plurality of mandrel support means for supporting ones of said objects thereon;

a coating transfer means located adjacent said drum, said coating transfer means adapted to contact said exterior surfaces of the objects as the objects move through a coating zone;

said mandrel cam being disposed radially outwardly of said cam followers for allowing said mandrels to move outwardly away from said drum axis for contacting said coating transfer means as said mandrels pass through the coating zone;

means for feeding said objects to said mandrels including a plurality of pockets associated with ones of said mandrels;

means for preventing engagement between said mandrel cam and said cam follower of said mandrel support means in response to a malfunction in feeding so as to prevent said mandrels from moving outwardly to said coating zone;

said means for preventing including a plurality of locking means mounted on said mandrel drum and associated with ones of said plurality of mandrel support means, each of said locking means engaging an associated mandrel support means and being responsive to the absence of an object in a predetermined portion of an associated pocket and to the improper seating of an object on an associated mandrel to hold the cam follower of said associated support means radially inwardly of said mandrel cam;

each of said locking means comprising a pair of movably mounted members, one of said members extending into the associated pocket so as to be moved in response to the presence or absence of an object in the associated pocket, said one member moving to a position holding said cam follower of the associated support means radially inwardly of said mandrel cam in the absence of an object in the associated pocket while moving to a position allowing said cam follower of the associated support means to move radially outwardly in the presence of an object in the associated pocket, the other of said members extending into the associated pocket so as to move in response to the proper and improper seating of an object on the associated mandrel, said other member moving to a position holding each of said cam followers radially inwardly when a predetermined portion of the object remains in the associated pocket while moving to a position allowing said cam follower of the associated support means to move radially outwardly when less than said predetermined portion of said object remains in the associated pocket.

3,996,852

LINE PRINTER

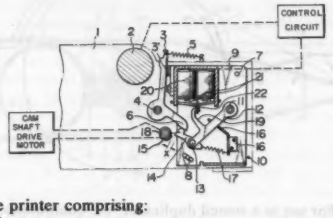
Nobuyoshi Matsuzawa, Tokyo, Japan, assignor to Copal Company Limited, Tokyo, Japan

Filed Dec. 16, 1974, Ser. No. 533,295

Claims priority, application Japan, Dec. 20, 1973, 48-145232[U]

Int. Cl.[2] B41J *9/36*

U.S. Cl. 101—93.31 1 Claim



1. A line printer comprising:

a main frame;

a selectively rotatable type-carrying drum rotatably mounted in said main frame and having a plurality of rows of type in the periphery thereof corresponding to columns of letters to be printed;

a plurality of hammers corresponding in number to said rows of type being pivotably mounted to said main frame and positioned adjacent to and spaced from said periphery of said drum for effecting the printing operation;

a cam shaft journalled in said main frame and adapted to be continuously rotated during the printing operation by motor means;

a sub frame;

a plurality of selector levers pivoted at one end on a common selector lever shaft mounted in said sub frame, each being positioned in alignment with the respective hammers;

a plurality of drive levers pivoted at one end thereof to the other ends of said selector levers, respectively, and spring biasing means connected between said sub frame and said drive levers for urging said selector levers to pivot in one direction, said drive levers being disposed adjacent to said cam shaft such that when said selector levers are pivoted in the other direction against the biasing force of said spring biasing means, the other ends of said drive levers engage said cam shaft which, during rotation thereof, operates through a cam portion thereon to push said other ends of said drive levers into abutment with one end of said hammers so as to pivot the hammers to cause them to strike against the periphery of said drum;

a plurality of selector magnets provided in association with said selector levers, respectively;

a plurality of selector iron peices provided adjacent to said selector magnets, respectively, and connected to said selector levers to be attracted by the magnets when the magnets are energized whereby the selector levers are pivoted in said other direction; and

a control circuit connected to said selector magnets for selectively energizing the selector magnets;

said selector magnets, said selector iron pieces, said selector lever shaft, said selector levers and said drive levers being mounted upon said sub frame which is formed as a separate member from said main frame, and said sub frame being adjustably secured to said main frame so that the position of the sub frame is adjustable relative to the main frame, whereby said drive levers are simultaneously properly positioned with respect to said cam shaft.

3,996,853

STENCIL LOADING DEVICE

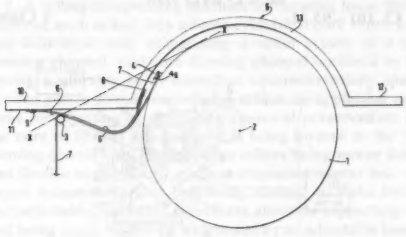
Albert George Ronald Gates, London, England, assignor to Gestetner Limited, London, England

Filed June 10, 1975, Ser. No. 585,719

Claims priority, application United Kingdom, June 11, 1974, 25931/74

Int. Cl.² B41F *15/08, 15/38*

U.S. Cl. 101—116 **10 Claims**



2. For use in a stencil duplicator, the combination comprising a rotatable support; a peripheral surface of the rotatable support on which, in use of the duplicator, a stencil is carried; a rotatable supporting roller spaced from the peripheral surface of the rotatable support and having its rotational axis parallel to that of the rotatable support; a portion of the feed path for a stencil during laying of the stencil onto the said peripheral surface of the support extending from said rotatable supporting roller to said rotatable support; and a stationary member extending between said rotatable support and said rotatable supporting roller and defining a smoothly arcuate guide surface defining a part of said portion of the feed path, the rotatable supporting roller being positioned, in use, closely adjacent and parallel to said guide surface whereby the roller will hold a stencil in contact with the guide surface during winding of the stencil onto the support and said guide surface will contact the stencil across the entire stencil width along said part of said portion of the stencil feed path during laying of said stencil.

3,996,854

DUPLICATING APPARATUS

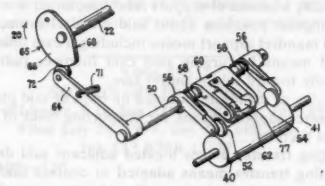
George E. Shepherd, Dollard-des-Ormeaux, Canada, assignor to Procedures, Systemes et Methodes P.S.M. (1972) Inc., Quebec, Canada

Continuation of Ser. No. 422,370, Dec. 6, 1973, abandoned. This application July 1, 1975, Ser. No. 592,353

Int. Cl.² B41L *11/08*

U.S. Cl. 101—132.5 **10 Claims**

1. Duplicating apparatus including means for transferring printed information from a master card to a receiving copy by means of the hectographic process comprising the combination of a frame, a master card carrying drum rotatable in a predetermined sense for effecting one duplication per revolution of said drum when a receiving copy is present, a main shaft extending horizontally and being journalled to said frame, said drum being of relatively large diameter and being fixedly supported to the intermediate portion of said main shaft for rotation therewith, actuating means connected to said main shaft for rotating same, whereby any number of copies can be made from a master on the drum by simply turning the drum with the master attached thereto the desired number of times while feeding separate receiving copies thereto, a pressure roll made of rubber-like material rotatably mounted to said frame on a pressure roll shaft parallel to said main shaft and vertically spaced therebelow, means for maintaining the periphery of said pressure roll in constant frictional engagement with the periphery of said drum, a feed roll made of rubber-like material rotatably mounted to said frame on a feed roll shaft located essentially forwardly of said pressure roll shaft and extending parallel thereto, drive means for interconnecting said feed roll and said pressure roll and for causing rotation of said feed roll upon rotation of said pressure roll in the same sense and at the same linear speed, a pivotable shaft mounted to said frame parallel to said main shaft and extending slightly above and slightly behind said feed roll shaft, a moistening roll yoke secured to said pivotable shaft for angular displacement therewith, a moistening roll rotatably mounted to said yoke around an axis parallel to said pivotable shaft, said moistening roll being substantially shorter than said feed roll, a pair of forwardly extending spring located nip roll



levers pivotably mounted on said pivotable shaft and rotatable relative thereto, each said nip roll lever carrying a freely rotatable nip roll resiliently urged into constant engagement with said feed roll, the nip rolls and the feed roll forming a means for initially receiving the receiving copy into the apparatus and for cooperating with each other to feed the copy directly to the drum and pressure roll, a cam lever connected to said pivotable shaft and projecting rearwardly toward said main shaft, return spring means for urging said cam lever toward said main shaft, cam means secured to said main shaft for pivoting said cam lever, pivotable shaft, and yoke to raise and lower said moistening roll toward and away from said feed roll, whereby the turning movements of the main shaft are translated directly into intermittent movements of the moistening roll into and out of engagement with the feed roll to thus permit contact therewith over a substantial angular displacement of said cam means, wick means for wetting said moistening roll with solvent, stop means for controlling the starting angular position of said main shaft at the beginning of every successive revolution of said drum, and adjustment means for said stop means for varying said starting angular position to vary the angular position of the master on the drum, relative to the leading edge of the sheet, to vary the location of the master relative to the leading edge of the receiving copy.

3,996,855

LABEL CUTTER AND DISCHARGE FOR A PRINTER

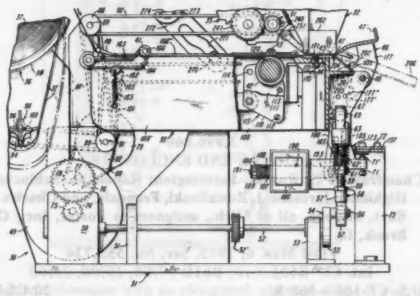
Robert M. Pabodie, Dayton, Ohio, assignor to Monarch Marking Systems, Inc., Dayton, Ohio

Division of Ser. No. 329,771, Feb. 5, 1973, Pat. No. 3,902,412, which is a continuation-in-part of Ser. No. 215,820, Jan. 6, 1972, Pat. No. 3,767,098. This application Jan. 17, 1975, Ser. No. 541,961

The portion of the term of this patent subsequent to Sept. 2, 1992, has been disclaimed.

Int. Cl.² B41F *1/08, 13/56;* B41L *15/14;* B26F *1/46*

U.S. Cl. 101—291 7 Claims



1. In a printing apparatus having a stationary frame, means mounted by the frame for printing data on a web of record members, the printing means having a stationary part fixed to the frame and a cooperable movable part, means for feeding record members to the printing means, means disposed downstream of the printing means for severing printed records from the web, the severing means including first and second cooperable severing members mounted for relative movement on the movable part of the printing means, one of the first and second severing members being a movable severing member, and means for actuating the movable severing member, the improvement comprising a resilient deflector separate from the feeding means and contacted by the movable severing member while a record is being severed from the web for preventing the severed record member from falling out of reach in the apparatus.

3,996,856

DEVICE FOR CONTROLLING THE DOCTOR ROLLER OF A PRINTING PRESS

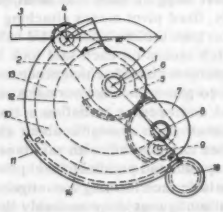
Hermann Beisel, Walldorf, Germany, assignor to Heidelberger Druckmaschinen Aktiengesellschaft, Heidelberg, Germany

Filed July 31, 1974, Ser. No. 493,385

Claims priority, application Germany, July 31, 1973, 2338743

Int. Cl.² B41F *31/14, 31/30;* B41L *27/36*

U.S. Cl. 101—350 7 Claims



1. Device for controlling the doctor roller of a printing press comprising an oscillating control lever, a control member formed with at least part of a gear rotatably mounted on said control lever, a transmission member formed with at least part of a gear mounted on a shaft for the doctor roller and means for rotating said transmission member relative to the shaft in one rotary direction, and for preventing rotation of said transmission member in the other rotary direction, said transmission member being couplable with the shaft for rotation therewith in the other rotary direction, the gear parts of said control member and said transmission member being in meshing engagement with one another, a pivotally mounted control disc formed with an guide cam, and a control roller rotatably mounted on said first rotary member and guidably movable on said guide cam.

3,996,857

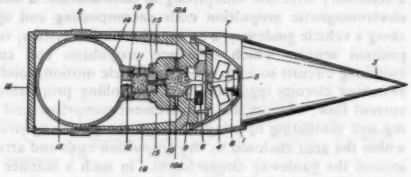
JUNGLE PENETRATION MUNITION

William V. Padula, Cranford, and William Serensen, Jr., North Brunswick, both of N.J., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed May 10, 1972, Ser. No. 251,983

Int. Cl.² F42B *25/22*

U.S. Cl. 102—7.2 14 Claims



1. A spin-stabilized jungle penetration projectile comprising:

A. a first housing including a cylindrical shell having a rotating band, a rear cover, and a forward conical ogive;

B. an anti-personnel munition located in the rear end of said shell and comprising (1) a second housing containing a high explosive charge, (2) a detonator for said charge, and (3) a delay detonating charge contiguous to said detonator; and

C. means for expelling said anti-personnel munition and said cover from said first housing, comprising:

1. a cup-shaped main casing mounted within said shell with its base forward and its side wall extending rearwardly and slidably engaging the outer periphery of said second housing, and having an axial bore in said base containing an explosive expelling charge exposed to the forward end of said munition for expelling the latter and also exposed to said delay detonating charge for initiation thereof;

2. means for initiating said propelling charge on impact of said projectile with a target comprising a second casing within said shell, between said main casing and said ogive and collapsible with said ogive on impact, an anvil axially mounted in said second casing, a forwardly-biased firing pin aligned with the longitudinal axis of said projectile, centrifugal weights biasedly disposed between said firing pin and said anvil prior to launching said projectile, a biased detonator held out of line with said longitudinal axis by said firing pin prior to launch, and a firing train composition connecting said biased detonator with the forward end of said expelling charge;

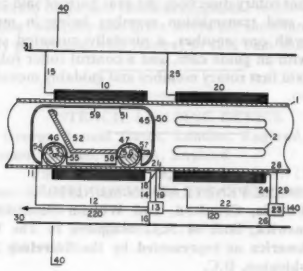
whereby, when said projectile is launched, the spin of said projectile causes said weights to move outward, releasing said firing pin to move toward said anvil and release said biased detonator, which then moves into firing position in line with said firing pin, ready for firing on impact.

3,996,858

LINEAR SOLENOID MOTORS

Donald W. Sangl, 11 Blue Jay Drive, Brentwood, N.Y. 11717

Filed Mar. 4, 1974, Ser. No. 447,653
Int. Cl.² B61B 13/12
U.S. Cl. 104—148 LM 4 Claims



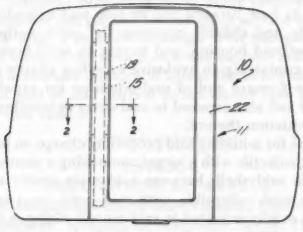
1. A conventional electrically operated linear solenoid motor for moving a ferromagnetic vehicle member relative to a stationary structure comprising in combination: a series of electromagnetic propulsion coils encompassing and spaced along a vehicle guideway; a power distribution system; vehicle position sensors which influence propulsion coil current switching circuits so as to produce vehicle motion; solid state switching circuits regulating and controlling propulsion coil current flow; wherein the improvement comprises: coil cooling and ventilating openings through the guideway structure within the area enclosed by the propulsion coils and arranged around the guideway circumference in such a manner as to not interfere with vehicle suspension systems.

3,996,859

RAILWAY VEHICLE DIAPHRAGM FACE PLATE ASSEMBLY

William C. Heisler, Glenside, and George W. Else, Warminster, both of Pa., assignors to The Budd Company, Troy, Mich.

Filed Apr. 18, 1975, Ser. No. 569,255
Int. Cl.² B60D 5/00; B61D 17/14, 17/22, 49/00
U.S. Cl. 105—15 7 Claims



1. A railway vehicle diaphragm, comprising in combination, an elastomeric cushion body secured around an end opening of a vehicle, an anchor plate adhesively bonded to the longitudinal outer end of said cushion body, and a face plate unit removably secured to said anchor plate, said anchor plate and said removable face plate unit being wider than the elastomeric cushion body and being secured together outside the width of said elastomeric cushion body.

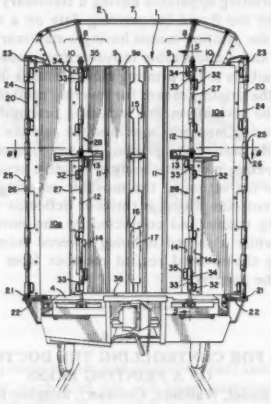
7. A railway vehicle diaphragm, comprising in combination, an elastomeric cushion body secured around an end opening of a vehicle and having plurality of recesses adapted to receive nuts and bolts therein, an anchor plate adhesively bonded to a longitudinal outer end of said elastomeric cushion body, said anchor plate having a plurality of bolt holes disposed in alignment with said plurality of recesses, a plurality of nuts disposed within said recesses of said elastomeric body and adjacent said bolt holes to receive a plurality of securing bolts, said anchor plate being adhesively bonded to the longitudinal outer end of said cushion body, a face plate having a plurality of openings removably secured to said anchor plate, and means including a plurality of securing bolts connected to said plurality of nuts for securing said face plate unit to said anchor plate.

3,996,860

VEHICLE END ENCLOSURE

Chandrakant D. Ravani, Farmington; Ronald G. Schluchter, Highland; Jaroslaw J. Rostafinski, Ferndale, and Charles M. Burt, Milford, all of Mich., assignors to Portec, Inc., Oak Brook, Ill.

Filed Mar. 6, 1975, Ser. No. 555,724
Int. Cl.² B60J 5/10; B61D 17/06, 19/00, 23/00
U.S. Cl. 105—368 R 20 Claims

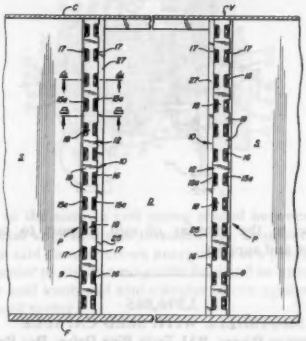


1. An end enclosure for a transport vehicle having a main deck and two side walls defining an end opening therebetween including, a pair of door assemblies each having an inner door panel and an outer door panel, each said panel having an outside face and inside face and provided with an inner edge and outer edge, a lock bar/pivot tube assembly pivotally joining the respective inner edge of each said outer panel to the respective outer edge of each said inner panel of each said door assembly, fixed pivot means attaching the outer edge of each said outer panel to one side of said vehicle end opening, releasable catch means on each said lock bar/pivot tube assembly engageable with said vehicle when said door panels are disposed in a co-planar manner normal to said side walls and enclosing said end opening to define a closed position, said inner door panels each pivotable about said lock bar/pivot tube assemblies to a position with said inner door panel outside face juxtaposed and parallel to said pivotally joined outer door panel outside face forming a contiguous door assembly, and said thus contiguous door assembly thereafter pivotable about said fixed pivot means to a position parallel the outside of one said side wall with said inside face of said inner door panel juxtaposed said side wall.

3,996,861
NAILABLE METAL POST AND STRAP ANCHOR STRUCTURE

Albert T. Santho, 1920 Brandywine Drive, Columbus, Ohio 43220

Filed Oct. 23, 1975, Ser. No. 625,018
Int. Cl.² B60P *7/08, 7/16;* **B61D** *45/00, 49/00*
U.S. Cl. 105—480 **6 Claims**



1. In combination with an elongated, channel-shaped, outer post which includes a central base web, opposite side walls extending perpendicularly from said base web and terminating in opposite, laterally outwardly turned edge flanges disposed in substantially parallel relation to said base web; an elongated, channel-shaped insert positioned in the channel of said outer post and having a base web disposed in closing relation to the channel of said outer post and opposite side walls welded at intervals to the opposite side walls of said outer post, the side walls of said insert being formed at longitudinally spaced intervals with inwardly recessed areas disposed in slightly spaced relation to the adjacent surfaces of the side walls of said outer post, the inwardly recessed areas of the side walls of said insert defining with the adjacent surfaces of the side walls of said outer post a plurality of longitudinally spaced apart, nail-clinching slots opening outwardly of said post along each side of said insert; and an elongated face plate extending longitudinally of said post and secured to the outwardly turned edge flanges thereof, in at least partially covering relation to said insert, said face plate being formed at longitudinally spaced intervals with sets of transversely spaced apart nail-receiving apertures disposed in alignment with the nail-clinching slots formed between the side walls of said outer post and said insert.

3,996,862
WASTE DISPOSAL SYSTEM

Ferdinand Besik, Mississauga, and Anant S. Deshpande, Oakville, both of Canada, assignors to Ontario Research Foundation, Sheridan Park, Canada

Filed Feb. 10, 1976, Ser. No. 656,798
Claims priority, application United Kingdom, Feb. 13, 1975, 6205/75
Int. Cl.² F22B *33/18;* **F23G** *5/12*
U.S. Cl. 110—10 **10 Claims**

1. A method of waste disposal, which comprises:

feeding solid waste to an incinerator having a primary combustion zone and a secondary combustion zone in fluid-flow relationship with said primary combustion zone,

said solid waste having a calorific value of about 3500 to 6000 BTU per lb, a bulk density of about 4.0 to about 10 lbs/cu ft, a moisture content of about 10 to about 35 percent by weight and comprising a plurality of refuse components consisting of:

about 40 to about 65 percent by weight of paper waste,

about 5 to about 35 percent by weight of food waste,

about 1 to about 9 percent by weight of rubber, plastic and leather wastes,

about 0.1 to about 11 percent by weight of textile wastes,

0 to about 20 percent by weight of garden wastes, and about 10 to about 30 percent by weight of incombustible solids,

feeding an oxygen-containing gas to said primary combustion zone,

igniting said solid waste to a self-sustaining burning condition,

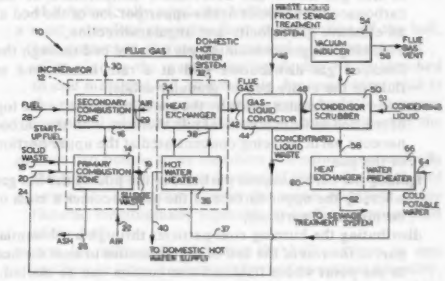
burning substantially completely the combustible portion of said ignited solid waste in the presence of said oxygen-containing gas to produce a flue gas product containing unused oxygen, carbon dioxide, carbon monoxide, volatile hydrocarbons and entrained particulate solids and an environmentally sterile ash comprising said uncombustible solids,

recovering said ash from said primary combustion zone,

flowing said flue gas product through said secondary combustion zone,

feeding an oxygen containing gas to said secondary combustion zone,

heating said flue gas product in said secondary combustion zone in the presence of said oxygen-containing gas to cause oxidation of said carbon monoxide and hydrocarbons to carbon dioxide,



removing a hot flue gas from said secondary combustion zone,

controlling the flow of said oxygen-containing gas to said primary combustion zone and the temperature of said hot flue gas exiting said secondary combustion zone to achieve

i. substantially complete combustion of combustibles in said solid waste,

ii. substantially complete conversion of carbon monoxide and hydrocarbon in said flue gas to carbon dioxide in said flue gas exiting said secondary combustion zone,

iii. minimization of fuel consumption in said heating in said secondary combustion zone, and

iv. minimization of entrained particulates solids concentration in said flue gas exiting said second combustion zone,

utilizing a substantial proportion of the calorific value of heat in said hot flue gas while cooling said flue gas to a temperature below about 100° F,

scrubbing said flue gas during said cooling thereof substantially free from entrained particulate matter and any water soluble gaseous products, and

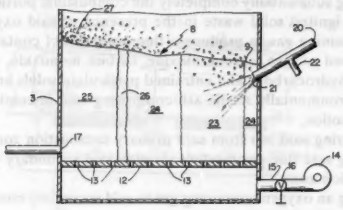
discharging a cool and environmentally pure flue gas stream.

3,996,863

RAPID IGNITION OF FLUIDIZED BED BOILER

Liman D. Osborn, Alexandria, Va., assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Mar. 15, 1976, Ser. No. 666,535
Int. Cl.² F23D 19/00
U.S. Cl. 110—28 J 6 Claims



1. A method for starting up a combustion fluidized bed which comprises:

maintaining a bed of granular solids comprising carbonaceous particles mixed with inert particles at the lower end of a fluidized bed combustion vessel having a fluidizing gas distribution grid;

spouting the bed at a portion thereof by directing a stream of hot gas above the combustion temperature of the carbonaceous particles at the upper portion of the bed at an effective gas velocity and angular direction;

introducing oxygen-containing gas into the bed through the fluidized gas distribution grid at a rate insufficient to fluidize the entire bed of granular solids;

transferring granular solids by the spouting action to the top of the bed to form a conical pile thereon, with the carbonaceous particles being concentrated at the upper portion of the pile;

igniting the carbonaceous particles in the pile by the hot gas whereby the upper surface of the pile becomes a mass of burning coal particles;

distributing the burning coal particles through a substantial part of the rest of the bed of solid granules to heat the bed to the point where fluidized combustion can be started;

cutting off the flow of hot spouting gas into the combustion vessel; and

increasing the flow of oxygen-containing gas through the fluidizing gas distribution grid to fluidizing conditions over the entire bed to achieve fluidized combustion.

3,996,864

FURNACE DAMPER AND SUPPORT

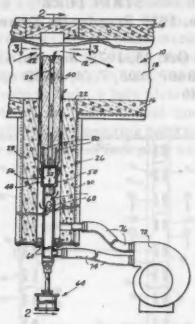
Allen Jacob Jones, Grants Pass, Oreg., assignor to S. J. Agnew, Tenino, Wash.

Filed Dec. 15, 1975, Ser. No. 640,896
Int. Cl.² F23L 13/06
U.S. Cl. 110—163 12 Claims

1. Apparatus for controlling the flow of combustion gases along a path through a furnace conduit wherein said conduit has an opening defined in one of its sides, comprising

a damper mounted for shifting between extended and retracted positions through said opening with a leading edge of said damper and portions of said damper adjacent said edge moving into said path when in an extended position and moving out of said path when in its retracted position, said damper being constructed of a refractory material,

a metallic damper support connected to and supporting the edge of said damper opposite its said leading edge, said support having a coolant fluid flow passage defined therein and apertures providing communication between said passage and the exterior of said damper support through which a flow of coolant fluid may pass from said



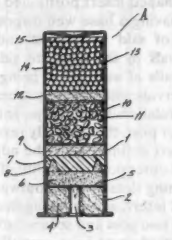
passage to the exterior of said support to cool said damper and support.

3,996,865

SHOTSHELL WITH SEED CAPSULE

Vernon Thomas Dwyer, 931 Twin Pine Drive, Des Peres, Mo. 63131

Continuation-in-part of Ser. No. 488,169, July 12, 1974, abandoned. This application June 20, 1975, Ser. No. 588,685
Int. Cl.² A01C 1/00
U.S. Cl. 47—1 R 7 Claims



1. A cartridge comprising means defining a tubular casing, primer means located in one end portion of said casing, a propellant charge disposed above said primer means, first and second spaced apart wad means located overlyingly of said propellant charge for defining a first compartment, a load of viable ingredients comprising germinative seeds provided in said first compartment, means enclosing said casing at its end remote from said primer means and spacedly above said second wad means to cooperate therewith for defining a second chamber, and a multi-missile charge disposed in said second chamber.

3,996,866

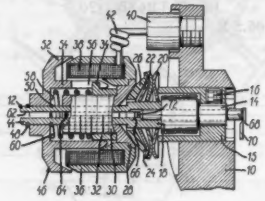
UPPER THREAD TENSION ADJUSTING ASSEMBLY WITH AUTOMATIC RELEASE DEVICE

Nereo Bianchi, Pavia, Italy, assignor to Necchi S.p.A., Pavia, Italy

Filed Apr. 9, 1975, Ser. No. 566,277
Claims priority, application Italy, May 6, 1974, 42904/74
Int. Cl.² D05B 47/04
U.S. Cl. 112—254 1 Claim

1. A device for automatic tension release in an upper thread tension adjusting assembly comprising a mounting shaft fixed on the sewing machine head, a centrally hollow body axially slidable along said shaft and being externally threaded, tension

discs mounted on said shaft between a fixed portion of said sewing machine head and said axially slidable body, an internally threaded nut placed onto the threaded portion of said body, a circular crown of magnetic material fixedly strictly secured to said body, a knob of magnetic material having an inner wall rotatably mounted on said shaft and axially fixed



relative to the same, a coil spring placed between said inner wall of said knob and said threaded nut; a copper thread coil placed in said circular crown energizable at a predeterminated time in order to create a magnetic field and an attraction force between said knob and said circular crown against the action of said coil spring.

3,996,867

PROCESS AND APPARATUS FOR FORMING TEARABLY DETACHABLE PORTION ON SHEET

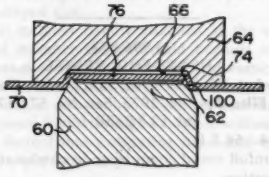
Keiji Taniuchi, No. 6-7, 2-chome, Nishi-Koujiya Ohta, Tokyo, Japan

Filed Feb. 21, 1975, Ser. No. 551,657

Claims priority, application Japan, May ., 1974, 49-48721; Dec. 24, 1974, 49-147588

Int. Cl.² B21D *51/00*

U.S. Cl. 113—1 F **7 Claims**



1. A process for forming a tear off detachable portion on a sheet of distendable material comprising the steps of:

a. forming a continuous groove in said sheet of distendable material to define a first lid portion, said groove being substantially V-shaped in section;

b. recessing said first lid portion with respect to said sheet to create a deformed and distended wall which is positioned adjacent said lid portion whereby said groove and said deformed and distended wall cooperate to provide a weakened portion adjacent the perimeter of said first lid portion to permit said first lid portion to be easily detached from the remainder of said sheet.

3,996,868

WINDSURFER

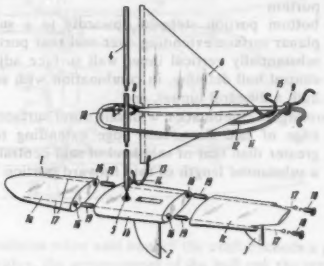
Fritz Schagen, Rossptad, Germany, assignor to Fa. Immobilien Commerce Estbl. Dr. Ivo Beck, Vaduz, Liechtenstein

Filed May 14, 1975, Ser. No. 577,464

Claims priority, application Germany, May 14, 1974, 2423251

Int. Cl.² B63H *9/04*

U.S. Cl. 114—39 **5 Claims**



1. A windsurfing vessel, such as a surfboard or aquaplane equipped with a sail, the apparatus comprising in combination:

an elongated vessel hull capable of supporting a rider thereon, the vessel hull having at least one transverse separation joint along which it is separable into a plurality of longitudinally adjoining hull sections;

a mast extending upwardly from a midportion of the hull, being attached thereto by means of a universal joint;

a sail carried by the mast, including rigging means attached to said mast and sail, respectively, for converting wind in the sail into motive power on the vessel body, in response to manual adjustment of the sail and mast position by the rider;

at least two hollow spine members extending longitudinally through at least a major portion of the hull's length and across its separation joints, the spine members being likewise longitudinally separable at each separation joint of the hull;

means for releasably attaching the hull sections to one another, to form a substantially rigid structural assembly, said section attaching means including tensioning cables extending through the hollow spine members; and

means for rotationally interlocking the adjoining hull sections at the separation joints.

3,996,869

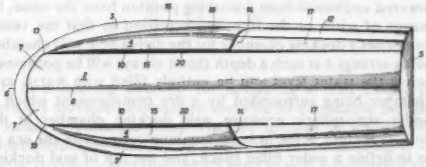
DIHEDRAL TUNNEL BOAT HULL

Robert O. Hadley, 2111 Bitter Creek Drive, Austin, Tex. 78744

Filed Sept. 8, 1975, Ser. No. 610,940

Int. Cl.² B63B *1/06*

U.S. Cl. 114—56 **9 Claims**



1. A boat hull designed for stable operation as a planing-type hull in rough water conditions, said hull having a bow and transom, a forward portion extending from said bow to approximately midships, and a rear portion extending from approximately midships to said transom, comprising

a substantially V-shaped central hull portion having a keel extending along a longitudinal axis from said bow to said transom, and

a pair of coextensive and adjacent side floats, one on each side of said central hull, said side floats being longitudinally symmetrical about said longititudinal axis, each of said side floats having

an outer surface inclined upwardly and outwardly with respect to said central hull extending over said forward portion

a bottom portion stepped upwardly to a substantially planar surface extending over said rear portion, and

a substantially vertical inner wall surface adjacent said central hull defining, in combination with said central hull, a dihedral tunnel, and

forming, in combination with said outer surface, a bottom edge of said float, said edge extending to a depth greater than that of said keel of said central hull, over a substantial length of said forward portion.

3,996,870

ARRANGEMENT IN OR RELATING TO A VESSEL FOR PERFORMING DIVING OPERATIONS BY MEANS OF A DIVING BELL

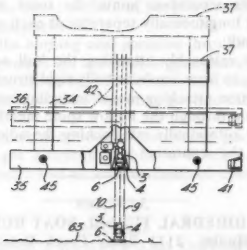
Thor Ove Haavie, Incognito Terrasse 1 II, N-Oslo 2, Norway

Filed Feb. 11, 1975, Ser. No. 549,030

Claims priority, application Norway, Feb. 15, 1974, 521/74

Int. Cl.² B63B *35/00*

U.S. Cl. 114—66 **9 Claims**



1. An arrangement in or relating to a vessel for performing diving operations by means of a diving bell which may be lowered and raised from a working position from the vessel by means of wires or the like, characterized in that the vessel comprises a docking chamber for the diving bell, said chamber being arranged at such a depth that it always will be positioned below the water level and be entirely filled with water, said chamber being surrounded by a dry compartment which is under atmospheric pressure, said docking chamber at the bottom thereof being in open communication with the sea so as to define a water filled space, and the top of said docking chamber being closed and having coupling means for tight connection to the diving bell when disposed in the water filled space within the docking chamber, said docking chamber having a peripheral wall thereon with a flange which mates with a flange on said diving bell, said coupling means cooperating with the flanges for coupling them together.

3,996,871

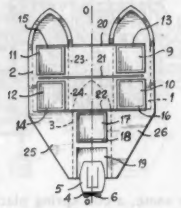
HYDROPLANING HULLS AND VESSELS EMPLOYING THE SAME

Pierre Boismard, Paris, France, assignor to Sexta-Etudes et Recherches, Callian, France

Continuation-in-part of Ser. No. 380,593, July 19, 1973, abandoned. This application Apr. 11, 1975, Ser. No. 567,422

Int. Cl.² B63B *1/20*

U.S. Cl. 114—66.5 R **12 Claims**



1. A multi-hulled nautical vessel especially suitable for hydroplane navigation, including:

at least three hulls of substantially identical construction; and

means connecting said hulls together to form a polygon shaped support structure having a front and rear, said polygon having an axis of symmetry extending from the rear to the front of the vessel;

each hull having a stern, a base and a pair of lateral sidewalls, and each hull having a vertical longitudinal plane of symmetry;

each of said lateral sidewalls having a rear planar portion extending forwardly from said stern and a front conical portion tangentially connected to said rear planar portion, said front conical portions of each pair of lateral sidewalls being connected to each other at an acute angle by a common generatrix forming the cutwater of the hull;

each part of the base of each hull about the vertical longitudinal plane of symmetry of the hull being a surface having a rear portion extending forwardly from said stern with a positive gradient to form an angle of incidence of from about 3° to 7° and a front portion tangentially connected to said rear portion and extending forwardly with a progressively increasing positive gradient;

said parts of the surface of said base of each hull meeting at the vertical plane of symmetry of the hull at a dihedral angle of from 168° to 180°.

3,996,872

HYDROFOIL VESSEL

Gifford Pinchot, III, R.D. 1 No. 58A, Jordanville, N.Y. 13361

Filed Apr. 28, 1975, Ser. No. 572,173

Int. Cl.² B63B *1/30*

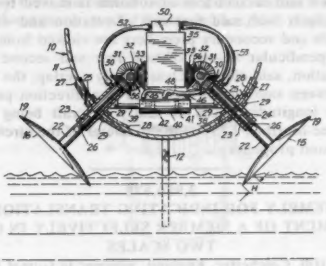
U.S. Cl. 114—66.5 H **17 Claims**

1. A hydrofoil vessel comprising, in combination:

a body portion;

at least one pair of circular members supported on opposite sides of the body portion, each of the circular members having an annular peripheral edge portion including a substantially flat lower surface having no portion thereof extending further inwardly of the member than a flat plane extending across said annular peripheral edge portion; said lower surface and said annular edge portion defining an annular thin foil-shaped peripheral portion adjacent the annular periphery of the circular member, with a geometric segment of said foil extending into the water at an angle with respect to the water surface, said annular peripheral edge portion having a width at least as great as the height of said geometric segment of said foil extending into the water; said segment of the foil in the

water providing support for the vessel when operated at its higher speeds; and



mounting means for rotatably connecting the circular members to the body portion.

3,996,873

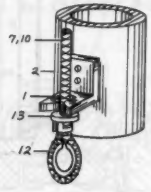
HALYARD CLIP

Charles August Weghorn, 360 Vallejo, Apt. 89, Millbrae, Calif. 94030

Filed Apr. 14, 1975, Ser. No. 567,474

Int. Cl.² B63H *9/04*

U.S. Cl. 114—108 **4 Claims**



1. A halyard clip for releasably securing a fitting on a loop of a halyard in a fixed position relative to the mast of a sailboat comprising:

a. A horizontal member having a generally keyhold shaped slot for receiving the halyard, said hole being of sufficient size to allow the halyard to pass through freely but not allowing the fitting on the loop of the halyard to enter said keyhole shaped slot;

b. a vertical member fixedly attached at the end of said horizontal member opposite said keyhole shaped slot having means for fixedly attaching said vertical member to the mast, whereby said halyard clip forms a generally L shaped member attached to the mast, and whereby said halyard passes freely through said hole without touching the sides thereof thus preventing stress and the creation of burrs on said halyard.

3,996,874

SURFACE CRAFT

Paul Winch, 31 Princes Court, Wembley, Middlesex, England

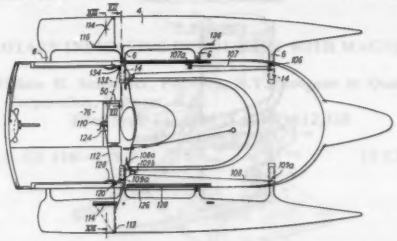
Filed Dec. 19, 1975, Ser. No. 642,492

Claims priority, application United Kingdom, Dec. 20, 1974, 55261/74

Int. Cl.² B63B *43/14*

U.S. Cl. 114—123 **22 Claims**

1. A trimaran comprising, in combination, a main hull and a pair of floats one to each side of the hull, pivot connection means between each float and the hull, the floats being displaceable on said pivot connection means between an outwardly extended position remote from the hull and a retracted position close to the hull, said pivot connection means being provided with locking means for maintaining the floats in their extended positions, means sensitive to the heel of the craft being disposed on the main hull and being operable on said locking means while the craft is underway for releasing the floats from said locking means for displacement to their re-



tracted positions when said heel of the craft exceeds a predetermined value, the arrangement of the hull and the retracted floats being such that a self-righting moment is obtained between the buoyancy forces thereon and their gravity forces at large angles of heel, and means for extending the floats from said retracted positions and re-engaging said locking means.

3,996,875

INTEGRAL HYDRAULIC PUMP AND WHEEL STEERING MECHANISM FOR SAILBOATS

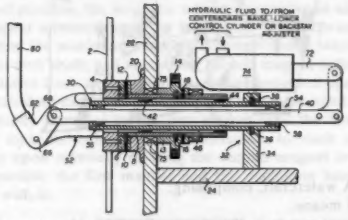
Martens Isenberg, Jr., 23 Cypress Ave., Glen Head, N.Y. 11545

Filed Dec. 4, 1974, Ser. No. 529,659

Disclosure was also published under second Trial Voluntary Protest Program on Feb. 24, 1976

Int. Cl.² B63H *25/00*; B63B *41/00*

U.S. Cl. 114—144 R **10 Claims**

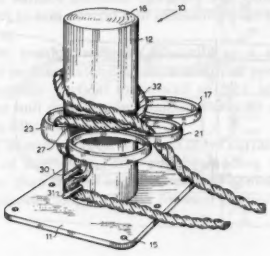


1. In a steering assembly for navigating a boat having a vertically movable centerboard movable by a hydraulic means including a hydraulic pump whereby to raise or lower said centerboard, said boat having a steering wheel connected to a hollow steering wheel shaft which shaft in turn is connected to a steering sprocket, the improvement for simultaneously raising or lowering the centerboard which comprises a hydraulic pump shaft disposed through said steering wheel shaft, said hydraulic pump shaft connected to an actuating means at said steering wheel and at its opposite end connected to said hydraulic pump.

3,996,876
MARINE LINE SECURING APPARATUS

Lawrence L. Sinclair, 123 Old Carriage Road, Ponce Inlet, Fla. 32019

Filed Nov. 10, 1975, Ser. No. 630,315
Int. Cl.² B63B 21/04
U.S. Cl. 114—218 11 Claims

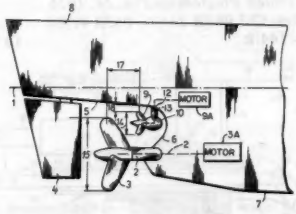


1. A line securing apparatus comprising in combination:
a base;
a post attached to said base;
at least one ring attached to said post whereby a line can be passed through said ring and looped over said post; and
wedge means attached to said post for wedging a line between said wedge means and said post for locking a line therein, said wedge means having an arc shaped member attached to said post at a slight angle to a perpendicular plane through said post for engaging a line, whereby lines may be connected to said line securing apparatus.

3,996,877
SHIP PROPELLER ARRANGEMENT

Herbert Schneekluth, Aachen, Germany, assignor to Schottel-Werft Josef Becker KG, Spay (Rhine), Germany

Filed July 31, 1975, Ser. No. 600,861
Claims priority, application Germany, Aug. 8, 1974, 2438147
Int. Cl.² B63H 5/08
U.S. Cl. 115—37 7 Claims

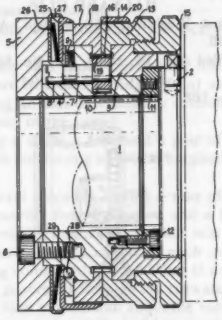


1. A watercraft, comprising:
hull means;
at least one main thrust propeller for said watercraft rotatably mounted at the stern of said hull means about a first fixed axis of rotation;
first drive means for driving said main propeller;
housing means pivotally mounted for movement about a vertical pivot axis at said stern of said hull means and in front of said main propeller;
a secondary propeller rotatably mounted on said housing means about a second axis of rotation fixed in said housing means, said second axis of rotation being located in a plane above said first axis of rotation;
second drive means for driving said secondary propeller independently of said first drive means; and
each of said main and secondary propellers defining a circle at the tips of the blades thereof on rotation thereof and when said second axis of rotation is moved to become coplanar with said first axis of rotation and when said main and secondary propellers are viewed from a plane perpendicular to one of said first and second axes of rotation, said circles at least partly overlap, the distance between said circles measured in a direction parallel to the longitudinal axis of said watercraft being at least three-fourths (0.75) of the diameter of the circle of said second propeller.

3,996,878
ASSEMBLY FOR INDICATING TRANSLATIONAL MOVEMENT OF A MEMBER SELECTIVELY IN ONE OF TWO SCALES

Stanley Hill, Colchester, England, assignor to Gamet Products Limited, England

Filed Oct. 17, 1975, Ser. No. 623,415
Claims priority, application United Kingdom, Nov. 8, 1974, 48559/74
Int. Cl.² B23Q 17/18
U.S. Cl. 116—115.5 7 Claims



1. An assembly for indicating translational movement of a member selectively in one of two scales, including a sub-assembly adapted for mounting on a fixed structure, a first dial for mounting coaxially with and for rotation about a shaft, a second dial for mounting coaxially with and for rotation about said shaft, said first and second dials both having internal teeth in mesh with an idler pinion carried by said sub-assembly, said first and second dials also having a first and second set of graduations marked respectively on the external surfaces thereof as continuing scales (as herein defined), and an indexable sleeve surrounding both of said scales, said sleeve being rotatable about the axis of said shaft and having two openings therein through which the graduations may be observed and read against a datum line associated with each opening, said openings being positioned so that only one thereof is in view from a given direction at any one time to observe the respective scale, said first dial being connectable for rotation by said shaft and said second dial being rotated by rotation of said first dial through said idler pinion, the number of teeth on the first and second dials being such as to give the desired conversion ratio from one said scale to the other.

3,996,879
REMINDER DEVICE FOR MEDICINE AND THE LIKE

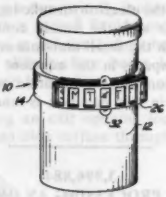
Vilma E. Walton, 70 Hubbard Drive, Glastonbury, Conn. 06033

Filed Jan. 7, 1976, Ser. No. 647,139
Int. Cl.² H09F 9/00
U.S. Cl. 116—121 7 Claims

1. A reminder device for attachment to a medicine container, the reminder device including:
collar means for mounting on a medicine container;

indicia means having an array of notations for indicating a schedule for taking medicine;

display means mounted on said collar means for viewing said notations on said indicia means, said display means



having a plurality of apertures aligned with notations on said indicia means; and

selectively adjustable indicating means movably mounted in said reminder device, said indicating means being selectively positionable in the apertures in said display means.

3,996,880

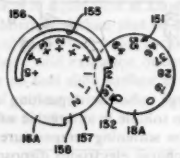
FIELD STRENGTH METER

Jack D. Cauldwell, Dayton, Ohio, assignor to Arvin Industries, Inc., Columbus, Ind.

Division of Ser. No. 477,776, June 10, 1974, Pat. No. 3,908,165. This application July 28, 1975, Ser. No. 599,374

Int. Cl.² G09F *9/00*

U.S. Cl. 116—129 S **3 Claims**



1. A digital readout device for presenting a visual indication of a two digit member in positive or negative values, comprising support means,

a higher order chart mounted on said support means and having a zero position and positive and negative numerals arranged arranged in a line in opposite directions from the zero position according to positive and negative movement,

a first frame on said support means outlining one of the numerals on said higher order chart,

means on the support means for moving said higher order chart to present different ones of said numerals in said first frame,

a lower order chart mounted on said support means adjacent said higher order chart and having separate sets of numerals arranged along parallel lines and reading in complementary fashion,

a second frame on said support means adjacent said first frame outlining one numeral of each set on said lower order chart,

means on the support means for moving said lower order chart to present selected numerals from each set in said second frame,

and screening means attached to said higher order chart and extending across said second frame,

said screening means having a first aperture coextensive with the positive numerals on said higher order chart that is aligned with one of the sets of numerals on said lower order chart.

said screening means also having a second aperture coextensive with the negative numbers on said higher order chart that is aligned with the other set of numerals on said lower order chart whereby selective movement of the two charts will present in said frames two digit numbers reading consecutively in ascending or descending fashion from zero.

3,996,881

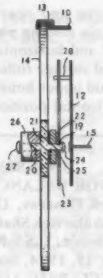
ROTARY INDICATING INSTRUMENT WITH MAGNETIC RESET

William H. Schneider, Pittsford, N.Y., assignor to Qualitrol Corporation, Fairport, N.Y.

Filed Sept. 11, 1975, Ser. No. 612,338

Int. Cl.² G01D *13/24*

U.S. Cl. 116—129 B **12 Claims**



1. In an indicating instrument including a casing having an open front end, a scaled dial fitted in the casing proximate its open end, and a rotatable drive shaft extending axially through the dial carrying an indicating hand on an end thereof forwardly of the dial; a transparent viewing crystal closing over the open front end of the casing and sealed around its periphery against entry of moisture into the casing, the crystal having fixed thereto an axially extending inner stub shaft and an axially extending opposed outer stub shaft, the latter projecting externally of the casing, a magnetically attractible maximum hand slidably mounted upon the inner stub shaft for relative rotation, the indicating hand having a forwardly extending ear adapted as the indicating hand rotates in one direction to engage the maximum hand and advance the latter around the inner stub shaft ahead of the indicating hand, and magnetic means for returning the maximum hand from its advanced position, the magnetic means comprising an annular first magnet mounted upon the inner stub shaft between the crystal and the maximum hand and having rotation relative to the inner stub shaft, and an annular second magnet defining a manipulative knob externally of the casing mounted upon the outer stub shaft for relative rotation, the maximum hand being magnetically attracted to the first magnet, and the first and second magnets being mutually attracted to each other, whereby upon manually rotating the second magnet in a return direction the first magnet and the maximum hand are carried with it.

3,996,882

FLAG STORAGE AND DISPLAY DEVICE

Clarence H. Martin, 12333 E. 215th St., Hawaiian Gardens, Calif. 90716, and Lynn Miller, 1070 Kings Road, Hartford, Wis. 54946

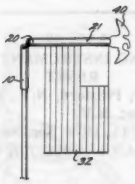
Filed Sept. 10, 1975, Ser. No. 611,921

Int. Cl.² G09F *17/00*

U.S. Cl. 116—174 **8 Claims**

1. A storage and display device for use in connection with a flag, said device comprising an upper housing having a storage roller rotatably mounted therein, said flag having its inner edge connected to said storage roller, said upper housing

being mounted for pivotal movement between a vertical position for the display of said flag and a horizontal position for the projection and retraction of said flag with respect to said upper housing; a fixed lower housing; a pivot arm operatively connected to said upper housing; a first motor mounted within



said fixed lower housing and operatively connected to said pivot arm for selectively moving pivotally said upper housing between said vertical and horizontal positions, and a second motor for rotating said storage roller to project or retract said flag with respect to said upper housing while said upper housing is disposed in horizontal position.

3,996,883

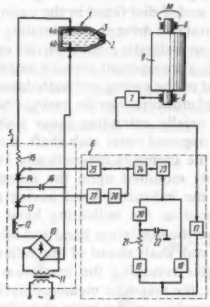
DEVICE FOR BALANCING ROTORS

Anatoly Alexandrovich Gusarov, Universitetsky prospekt, 5, kv. 470, and Lev Nikolaevich Shatalov, ulitsa Utrennyaya, 3, kv. 107, both of Moscow, U.S.S.R.

Filed May 28, 1974, Ser. No. 474,106

Int. Cl.² B05C *11/10, 5/00*

U.S. Cl. 118—8 **7 Claims**



5. A device for balancing rotors and to locate any unbalance therein, comprising a housing; a closed cylindrical chamber in said housing, provided with a removable nozzle and serving as a reservoir for a balancing compound in a liquid state; supports in which the rotor being balanced is rotated in front of said nozzle; means for rotating the rotor in said supports; a transmitter registering vibration parameters of said supports; two electrodes installed one opposite the other in said chamber and forming a discharge gap; a pulse generator having a charging circuit connected to said electrodes to deliver electric pulses thereto; said electrodes comprising electrohydraulic impact means in said chamber, energizable by said pulse generator; a control unit for said pulse generator, the output of said control unit being connected to said pulse generator while its input is connected to said tran smitter which, at the moments when a "light" point on the surface of the rotor passes in front of said nozzle, sends signals to said control unit and, on receiving these signals, said control unit sends corresponding signals to said pulse generator, to energize said impact means; the impacts being imparted to the balancing compound in said chamber, for discharging small amounts thereof through said nozzle onto the "light" point of the rotor by direct spraying action through said nozzle when said impact means is energized; wherein said chamber accommodates a movable partition dividing the same into two isolated spaces, said electrodes and said nozzle being located in different spaces, said space with the electrodes being filled with a neutral liquid in which the electrohydraulic impacts are produced, whereas said space with the nozzle contains the balancing compound of which the small amounts are discharged at the moments of the impacts in the adjacent space through said nozzle by the action of said partition which transmits the impacts and wherein said partition is made in the form of a flexible membrane.

3,996,884

DEVICE FOR PROCESSING AN ORGANIC HIGH MOLECULAR WEIGHT FILM

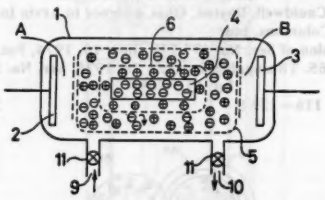
Kazuo Horiguchi, Kyoto, Japan, assignor to Susumu Industrial Co., Ltd., Kyoto, Japan

Division of Ser. No. 498,846, Aug. 16, 1974, Pat. No. 3,966,999. This application Mar. 3, 1976, Ser. No. 663,528

Claims priority, application Japan, Sept. 14, 1973, 48-104787

Int. Cl.² C23C *13/12*

U.S. Cl. 118—49.1 **2 Claims**



1. A glow discharge tube for depositing an organic high molecular weight film soluble in an organic solvent and having an essentially uniform softening temperature on a substrate, which comprises discharge electrodes disposed in the tube at opposite ends of the tube and defining a plasma zone therebetween, the substrate being electrically floatingly disposed within the plasma zone, a pair of opposed perforated screening plates between the discharge electrodes, a respective one of the screening plates being adjacent a respective end of the plasma zone, each screening plate being disposed between one of the electrodes and one of the plasma zone ends, an electric conductor connecting the screening plates to each other, a source of current connected to the discharge electrodes for passing electric discharge from the discharge electrodes through the screening plates, a perforated plate mounted between the screening plates and parallel to the substrate, the perforated plate extending over the whole area of the substrate, and means for introducing a monomer into the tube and the plasma zone through the perforated plate to the substrate to form the film.

3,996,885

APPARATUS FOR COATING A MULTIPLE NUMBER OF LAYERS ONTO A SUBSTRATE

Brian W. Jackson, London, England; Dean E. Winkler, and Charles B. Woodworth, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Division of Ser. No. 327,048, Jan. 26, 1973, Pat. No. 3,928,679. This application June 19, 1975, Ser. No. 588,261

Int. Cl.² B05C *5/02*

U.S. Cl. 118—50 **14 Claims**

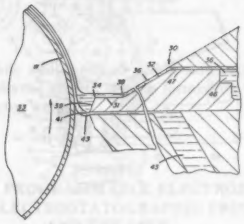
1. An apparatus for simultaneously coating at least two layers of liquid coating compositions onto a surface of a substrate, said apparatus comprising:

means for defining an extrusion slot having an extrusion

outlet adapted to be located in proximately spaced relationship relative to the substrate so that an unsupported bridge of a first liquid coating composition may be extruded through said slot to span the gap between said outlet and the substrate;

means for defining a downwardly inclined planar slide surface upon which a second liquid coating composition is adapted to flow as a layer before being coated on the substrate, said slide surface being located above said extrusion slot and being directed at an acute angle relative thereto;

means for defining an exit opening located adjacent the upper end of said slide surface through which the second



liquid coating composition is adapted to pass before being deposited onto said planar slide surface; and

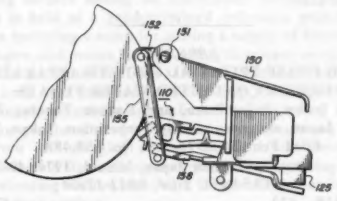
means for defining a rigid lip portion which extends from and is continuous with the lower end of said planar slide surface and is adapted to have the second liquid coating composition flow thereon, said lip portion being directed in the direction of liquid flow at an angle of lesser inclination to the horizontal than that of said planar slide surface, and said lip portion being located proximate to and generally above said extrusion outlet so that the coating composition on said slide surface is adapted to flow into the bridge of coating composition between said extrusion outlet and the substrate.

3,996,886

OIL METERING BLADE HOLDER ASSEMBLY

Oskar J. Braun, Williamson, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Oct. 29, 1975, Ser. No. 626,902
Int. Cl.² B05C *11/04*
U.S. Cl. 118—60 **2 Claims**



1. In an oil wetted heated pressure roll fusing apparatus for fusing toner images to copy sheet produced from a xerographic copying machine, an improved oil metering blade assembly comprising:

a frame,

a blade assembly positioned on said frame including a blade holding member mounted on pin means which is pivotable on said frame,

first spring means for engaging said pin means for positioning thereof in said frame,

a blade member supported by said blade holding member in contact with an oil wetted fuser roll surface to effect a uniform oil film thereon,

second spring means including a pressure loading member for applying a loading force on said blade holding member and blade member, and

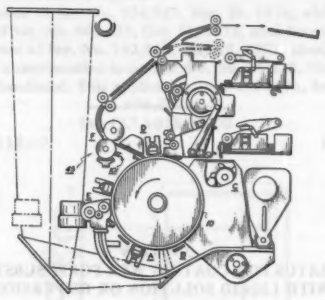
means for releasing the loading force on said blade holding member and blade member means for compressing said first spring means to retract said pin means from said frame to remove said blade holding member and blade member from said frame.

3,996,887

OIL METERING BLADE HOLDING DEVICE

Thomas A. Rengert, Macedon, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Oct. 29, 1975, Ser. No. 626,904
Int. Cl.² B05C *11/04*
U.S. Cl. 118—60 **4 Claims**



1. In an oil wetted heated pressure roll fusing apparatus for fusing toner images to copy sheets produced from a xerographic copying machine, an improved oil metering blade holding device comprising:

a frame,

a blade holder assembly positioned on said frame including a U-shaped holding member which is pivotable on an axis,

a blade member made of an elastic material received in said blade holding member and positioned in contact with an oil wetted fuser roll surface to effect a uniform oil film thereon,

spring means for applying a loading force about said axis on said blade holding member and blade member, against said fuser roll surface,

said blade holding member being formed with an undercut portion wherein the longitudinal extent thereof ranges from about 1 to about 1.5 times the blade thickness.

3,996,888

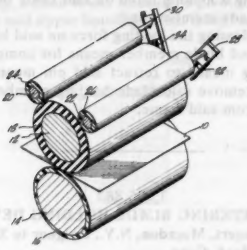
CLEANING AND LUBRICATING SYSTEM FOR FUSING APPARATUS

Clyde A. Lofdahl; Joseph H. Evans, and Dave D. Nyberg, all of Santa Clara, Calif., assignors to Raychem Corporation, Menlo Park, Calif.

Filed July 18, 1974, Ser. No. 489,709
Int. Cl.² B05C *1/10*
U.S. Cl. 118—70 **10 Claims**

1. An apparatus for lubricating and cleaning the surface of a toner fuser roller including a cleaning roller rotatably mounted and in contact with the surface of said fuser roller, the cleaning roller having a cross-linked polymeric material on its outer surface and said polymeric material having dispersed

therein a leachable lubricating material, whereby the cleaning roller lubricates said fuser roller to prevent toner particle



pickup until said leachable lubricant is depleted and thereafter removes toner particles from said fuser roller.

3,996,889

APPARATUS FOR COATING WEB-FORM SUBSTRATES WITH LIQUID SOLUTION OR DISPERSIONS

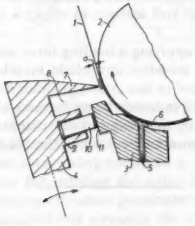
Horst Otten; Hans Frenken, both of Leverkusen; Heinrich Bussmann, Opladen, and Karl Voss, Leverkusen, all of Germany, assignors to AGFA-Gevaert, A.G., Leverkusen, Germany

Filed Apr. 7, 1975, Ser. No. 565,346

Claims priority, application Germany, Apr. 11, 1974, 2417720

Int. Cl.² B05C *11/04*

U.S. Cl. 118—126 3 Claims



1. An apparatus for coating substrate webs with a liquid, comprising a coating roller; a coating block having a fixed section and a pivotal section adjacent the periphency of the coating roller, the position of the pivotal section relative to the periphery of the coating roller determining the final thickness of the layer of liquid with which the web is coated, a pocket in one of the coating block sections having an opening disposed toward the other section, a replaceable precision-gauge block having flat smooth contacting faces received in the pocket and disposed in contact between the fixed and pivotal sections of the coating block to determine the position of the said pivotal section whereby replacement of the gauge block for precisely determining different coating thicknesses is facilitated.

3,996,890

APPARATUS FOR FORMING AND TRANSFERRING THIN LIQUID LAYERS

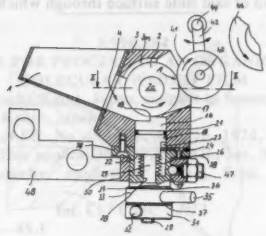
Werner Ringe, Geesthacht, and Jürgen Gömann, Dassendorf, both of Germany, assignors to Hauni-Werke Korber & Co., KG, Hamburg, Germany

Filed June 21, 1974, Ser. No. 481,859

Claims priority, application Germany, June 28, 1973, 2332920

Int. Cl.² B05C *1/08*

U.S. Cl. 118—262 14 Claims



1. In an apparatus for forming and transferring films of a liquid, particularly for applying liquid films to roller-shaped applicators in tobacco processing machines, a combination comprising a housing including spaced-apart first and second bearing portions having aligned openings therein and a liquid-containing receptacle having an outlet disposed between said bearing portions; a fountain roll rotatable about a fixed axis and having a median portion adjacent to and extending transversely of said outlet so that liquid issuing from said receptacle forms a layer around the periphery of said median portion when said roll rotates about said axis, said roll further having first and second journal end portions respectively mounted in the openings of said first and second bearing portions and the diameters of said end portions being identical with the diameter of said median portion; circumferentially complete first and second sealing rings respectively engaging the peripheries of said first and second end portions to prevent the liquid from spreading axially to the ends of said roll, said first and second sealing rings being respectively located in the openings of said first and second bearing portions; means for rotating said fountain roll; and a doctor mounted in said housing and having a blade adjacent to but spaced from the periphery of said median portion to control the thickness of that portion of said layer which passes beyond said blade when said roll rotates about said axis.

3,996,891

LIQUID PHASE EPITAXIAL GROWTH APPARATUS WHEREIN CONTACTED WAFER FLOATS

Nobuyuki Isawa, Sagamihara, and Kazuya Tanabe, Zama, both of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Feb. 27, 1975, Ser. No. 553,488

Claims priority, application Japan, Mar. 1, 1974, 49-24637

Int. Cl.² B05C *3/04*; B01J *17/04*

U.S. Cl. 118—423 6 Claims

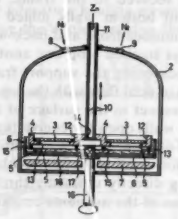
1. A liquid phase epitaxial growth apparatus comprising:

a vessel for containing a solution as a source of material for liquid phase epitaxial growth; holding means for holding at least one semiconductor wafer on which semiconductor wafer an epitaxial growth layer is to be formed; an air-tight container within which said vessel and said holding means are disposed; means for rotating said vessel in a horizontal plane;

said holding means including a hollow carrier proportioned to receive a semiconductor wafer in loosely fitting relation; and

means for effecting movement of said holding means in a

vertical direction with respect to the surface of said solution so that said holding means dips into said solution, said semiconductor wafer floats on the surface of said



solution while still confined within said hollow carrier, and said epitaxial growth layer is formed on said floating semiconductor wafer.

3,996,892

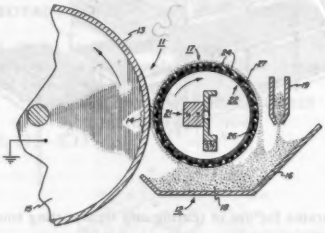
SPATIALLY PROGRAMMABLE ELECTRODE-TYPE ROLL FOR ELECTROSTATOGRAPHIC PROCESSORS AND THE LIKE

Delmer G. Parker, Rochester, and Joseph L. Scaletta, Henrietta, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Feb. 24, 1975, Ser. No. 552,011

Int. Cl.² G03G *13/09*

U.S. Cl. 118—658 **23 Claims**



8. In a magnetic brush development system for developing latent electrostatic images carried by an electrically insulative imaging surface having an electrically conductive backing which is held at a predetermined reference potential; said system including a sump for storing a supply of ferromagnetic developer, and means for circulating developer along a predetermined path running from said sump, through said development zone, and then back to said sump; the improvement in said means comprising an applicator roll including

a non-magnetic sleeve spaced a predetermined distance from said imaging surface adjacent said development zone, said sleeve being mounted for rotation about an axis extending widthwise of and substantially parallel to said imaging surface;

a stationary magnetic means supported within said sleeve for supplying a magnetic field shaped to magnetically entrain developer on said sleeve while the developer is being transported by said sleeve through pre-nip, nip, and post-nip regions of said development zone, the shape of said magnetic field being selected to cause the developer in the nip region of said development zone to form bristle-like streamers extending outwardly from said sleeve to brush against said imaging surface;

a plurality of axially extending elongated conductors carried by said sleeve at regular angular intervals about said axis; and

a plurality of stationary contacts located in fixed, spaced apart positions about said axis for applying different bias voltages to said conductors, said contacts being slidingly coupled to said conductors, whereby the bias voltages applied to said conductors vary as a function of rotation of said sleeve, thereby generating between said conductors and said backing a substantially stationary electrostatic field having a generally uniform intensity widthwise of said imaging surface and a pre-selected non-uniform intensity lengthwise of said imaging surface.

3,996,893

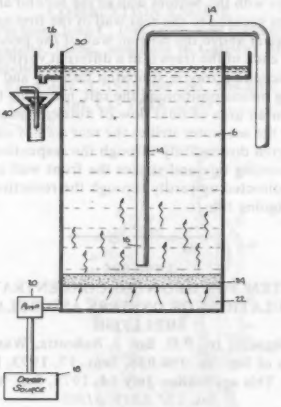
FISH HUSBANDRY SYSTEM

Keen W. Buss, Boalsburg, Pa.

Continuation of Ser. No. 534,923, Dec. 20, 1974, which is a division of Ser. No. 405,633, Oct. 11, 1973, abandoned, which is a division of Ser. No. 162,910, July 15, 1971, abandoned, which is a continuation-in-part of Ser. No. 16,830, March 5, 1970, abandoned. This application June 17, 1976, Ser. No. 696,894

Int. Cl.² A01K *63/00*

U.S. Cl. 119—3 **1 Claim**



1. A fish husbandry system comprising a plurality of generally vertical, waterfilled tanks each adapted to contain fish, aeration means connected with said tanks for providing oxygen to the water in the bottom region of each said tank, conduit means connected with said tanks for conducting water successively through said tanks in a serial flow path in which the water enters each said tank adjacent the bottom thereof and flows upwardly to exit from the upper region of said tank whereby in each said tank the head of water therein assists solution of the oxygen in the water and fish waste products are carried upwardly away, flow distributing means for distributing the water entering the bottom region of said tank evenly over the width thereof and causing the water to rise upwardly as a generally uniform, non-turbulent body extending substantially across the entire width of said tank in laminar flow at a rate of about one foot per minute, whereby the upflow of water carries the oxygen in the water to all the fish in said tank and also carries fish waste products upwardly away and water supply means providing a continuous supply of water to a first one of said tanks in the flow path to maintain the uniform flow of water through said tanks.

3,996,894

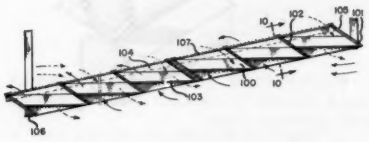
SYSTEM FOR GROWING CONCENTRATED POPULATIONS OF OYSTERS AND RELATED SHELLFISH

John L. Wiegardt, Jr., P.O. Box 2, Nahcotta, Wash. 98637

Division of Ser. No. 398,088, Sept. 17, 1973, Pat. No. 3,901,190. This application July 14, 1975, Ser. No. 595,507

Int. Cl.[2] A01K *61/00*

U.S. Cl. 119—4 8 Claims



1. A raft culture system utilizing the tidal flow of nutrient-laden sea water to furnish fool to a concentrated population of filter-feeding organisms held in a plurality of trays within the raft, comprising:

a support frame including spaced apart support members,

a series of trays secured between the spaced apart support members, each tray including side walls, front and rear walls connected to the side walls, a foraminous top wall, and a foraminous bottom wall on which the filter-feeding organisms rest, the rear wall of the first and succeeding trays also being the front wall of the second and succeeding trays with the bottom wall of the second and succeeding trays secured to the rear wall of the first and succeeding trays at above the bottom wall of the preceeding tray so that each of the trays is at a different vertical level than the preceeding tray in stair-step fashion, and

anchoring means positioning the raft, including the series of trays, in an area of tidal flow of nutrient-laden sea water so that the sea water strikes the rear wall of each tray and is directed downwardly through the respective trays with the incoming tide and strikes the front wall of each tray and is directed upwardly through the resective trays with the outgoing tide.

3,996,895

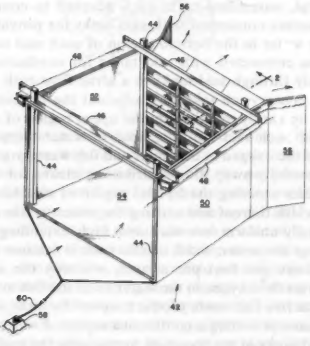
SYSTEM FOR GROWING CONCENTRATED POPULATIONS OF OYSTERS AND RELATED SHELLFISH

John L. Wiegardt, Jr., P.O. Box 2, Nahcotta, Wash. 98637

Division of Ser. No. 398,088, Sept. 17, 1973, Pat. No. 3,901,190. This application July 14, 1975, Ser. No. 595,546

Int. Cl.[2] A01K *61/00*

U.S. Cl. 119—4 6 Claims



1. A raft culture system utilizing the tidal flow of nutrient-laden sea water to furnish food to a concentrated population of filter-feeding organisms held in a plurality of trays within the raft, comprising:

a support frame,

a series of trays secured to the frame, each tray having parallel top and bottom walls joined together by side walls, and foraminous front and back walls, the first and succeeding trays stacked atop one another, and

anchor means positioning the support frame and series of trays in an area of tidal flow with the top and bottom walls inclined with respect to the surface of the water and the front and back walls open to receive the natural horizontal tidal flow of nutrient-laden water throughout the width of the population confined within each of the trays, the tidal flow being directly upwardly through the trays for even distribution of the nutrients contained in the water.

3,996,896

REARING CAGES

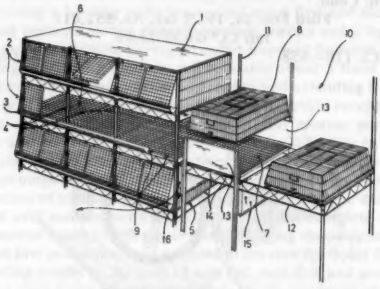
Joris Slaats, De Pinte, and Jan Vandenbogaerde, Waarmaarde, both of Belgium, assignors to N.V. Bekaert S.A., Zwevegem, Belgium

Filed Jan. 24, 1975, Ser. No. 543,937

Claims priority, application United Kingdom, Feb. 14, 1974, 6776/74

Int. Cl.[2] A01K *29/00*, *31/00*

U.S. Cl. 119—17 9 Claims



1. Apparatus for use in rearing and transporting small animals comprising

one or more rearing cages, each of which has a floor including at least two substantially coplanar floor panels each of which is removable from the cage while still carrying one or more animals,

a structure for receiving and supporting a floor panel when the latter is first removed from said rearing cage, said structure including underneath support means for said floor panel and side wall members for confining animals on the sides of said structure to said floor panel, and

a side-walled and roofed cage member in the form of an inverted basket adapted to be placed over and connected to said floor panel to form a transport cage.

3,996,897

REHEATER FOR A MOISTURE SEPARATOR REHEATER

Josef Herzog, Scotia, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Nov. 21, 1975, Ser. No. 634,131

Int. Cl.[2] F22G *1/00*

U.S. Cl. 122—483 7 Claims

1. A moisture separator steam reheater comprising:

a. a substantially pressure-tight vessel;

b. means to admit cool moisture laden steam to said vessel;

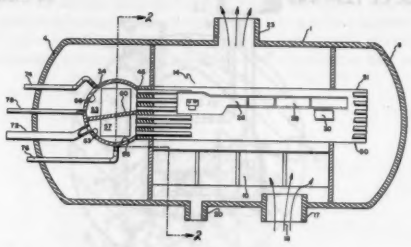
c. means for separating entrained moisture from said steam;

d. means for elevating the temperature of said moisture separated steam and including,

d_1. an array of a plurality of re-entrant tubes in a substantially U-shaped configuration through which array said steam passes in heat-exchanging relationship;

d_2. a header connected to both ends of said plurality of re-entrant tubes;

d_3. means for admitting heating steam to said header and for removing the cooled residue therefrom;



d_4. baffle means within said header operative to cause all of the heating steam passing from said steam admitting and removing means to pass twice in a U-shaped path through selected ones of said plurality of tubes;

e. drain means for removing moisture condensed from said heating steam from said header after each pass through said tubes; and

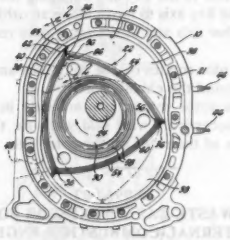
f. means for exiting heated, moisture separated steam from said vessel.

3,996,898

ROTARY COMBUSTION ENGINE APEX SEAL ARRANGEMENT

Jack A. Hart, Mount Clemens, and James H. Wolgemuth, Warren, both of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Aug. 29, 1975, Ser. No. 608,925
Int. Cl.² F02B *53/04*
U.S. Cl. 123—8.13 **1 Claim**



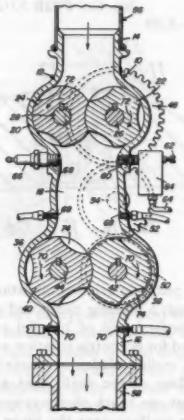
1. A rotary combustion engine comprising housing means having an internal peripheral wall and side walls which face each other, a rotor rotatably mounted in said housing means with sides facing said side walls and flanks having apexes that remain adjacent said peripheral wall as said rotor rotates, said rotor and said walls cooperatively providing a plurality of expansible chambers, intake ports in said side walls openable by said rotor sides to deliver a combustible gaseous mixture to said chambers as they expand in an intake phase, ignition means for igniting the mixture in said chambers following a combustion phase whereupon they expand in an expansion phase, an exhaust port openable by said rotor to exhaust said chambers as they contract in an exhaust phase, a pair of apex seal members mounted in a slot in and extending the width of each apex of said rotor, each pair of said apex seal members providing two spaced lines of sealing contact with said peripheral wall between adjacent chambers with a sealed space between said lines of sealing contact, gas seal means including side seals and corner seals mounted on said rotor sides sealingly engaging the oppositely facing side walls for providing sealing of said chambers adjacent the flanks of said rotor wherein said side seals pass over said intake ports during the opening and closing of said intake ports to said chambers, each said corner seal having a slot receiving the ends of one pair of said apex seal members, annular oil seal means mounted on said rotor sides radially inward of said gas seal means for engaging the oppositely facing side walls to prevent radially outward oil movement wherein the oil seal means are always radially inward of and never pass over said intake ports whereby there are provided sealed annular spaces between the gas seal means and oil seal means on said rotor sides that are opened to said intake ports during the intake phase of said chambers, and each pair of apex seal members and the associated said corner seal on both sides of said rotor having communicating external passageways for cooperating with the said side wall that they face to provide sealed gas leakage passage means continuously connecting each of said sealed spaces between the pairs of said apex seal members to said sealed annular spaces whereby any gas leakage from said chambers past any one of the lines of sealing contact of said apex seal members is directed by said sealed annular spaces to said intake ports to thereafter be inducted into said chambers during their intake phase.

3,996,899

POSITIVE DISPLACEMENT CONTINUOUS COMBUSTION ENGINE

Harvey D. Partner; John C. Dickerson, and Forrest D. Hansen, all of Pocatello, Idaho, assignors to Gateway of Discovery, Inc., Pocatello, Idaho

Filed Apr. 3, 1975, Ser. No. 564,835
Int. Cl.² F02B *53/08*
U.S. Cl. 123—8.25 **4 Claims**



1. A continuous combustion engine comprising passage means defining a flow passage having inlet and outlet ends and a central portion intermediate said ends defining a combustion chamber, positive displacement roots type gas pump means operatively associated with said inlet end for pumping gas under pressure therethrough into said combustion chamber and, during operation of said pump means to prevent reverse flow of gas under pressure therepast, positive displacement gas roots type motor means operatively associated with said outlet end for developing rotary torque in response to elevated gas pressure in said combustion chamber and passage of said elevated gas pressures therethrough, said motor and pump

means including rotary output and input shaft means, respectively, drive means drivingly connecting said output shaft means to said input shaft means for driving said pump means at a volumetric rate lower than the volumetric rate of said motor means, ignition means operatively associated with said combustion chamber for igniting a combustible mixture therein, said inlet end comprising an air inlet, and fuel injection means operatively associated with said combustion chamber for injecting fluid fuel under pressure directly into said combustion chamber, whereby an initial combustible mixture of air and fuel, at substantially ambient pressure, may be formed in said combustion chamber subsequent to a previous termination of operation of said engine and ignited by said ignition means for initially elevating the gas pressure in said combustion chamber sufficient to cause operation of said motor means, and thus said pump means, whereby a subsequent mixture of air and fuel at greater than ambient pressure may be formed in said chamber and ignited therein for continued operation of said engine.

3,996,900
REVOLVING PISTON COMBUSTION ENGINE OF TROCHOID TYPE

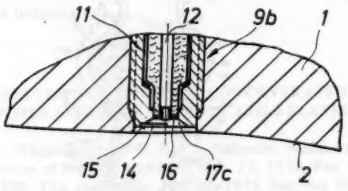
Karl Feierabend, Bad Rappenau-Treschklingen; Armin Bauder, Neckarsulm, and Fritz Zimmermann, Bad Rappenau, all of Germany, assignors to Adui NSU Auto Union Aktiengesellschaft, Neckarsulm, Germany

Filed Aug. 20, 1975, Ser. No. 606,072

Claims priority, application Germany, Aug. 26, 1974, 2440851

Int. Cl.² F02B *53/12*

U.S. Cl. 123—8.09 **2 Claims**



1. A rotary piston internal combustion engine of trochoidal type comprising; a housing composed of a shell with a multilobed inner surface and of parallel end walls, a polygonal piston mounted for eccentric rotation within said housing, said piston having sealing blades at its vertices which slide along the inner surface of the shell, inlet and outlet ports in the housing at least one spark plug arranged in a hole in the shell and having an endface near the inner surface of the shell, a space is said endface, a center electrode extending into said space and terminating short of said endface, at least one ground electrode extending laterally into said space toward the center electrode to form a spark gap therewith, a recess in said endface extending substantially over the entire outer boundary edge of said space and into the place of said spark gap, the spark plug being arranged in that region of the inner surface of the shell where during passage of a sealing blade no substantial pressure difference prevails between the two working chambers separated from each other by said blade, each flank of the piston being provided with a trough the greater portion of the volume of which lies in the leading part of the flank relative to the direction of rotation of the piston.

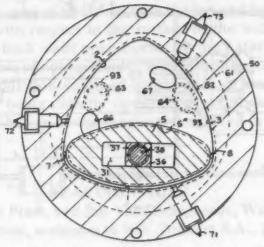
3,996,901
ROTARY PISTON MECHANISM

Richard A. Gale, 756 Jerusalem Road, Cohasset, Mass. 02025, and Donald L. Kahl, 62 Pheasant Hill Drive, Scituate, Mass. 02066

Filed Feb. 26, 1974, Ser. No. 445,930

Int. Cl.² F02B *53/00*

U.S. Cl. 123—8.45 **24 Claims**



1. A rotary piston mechanism for internal combustion engines, fluid motors, pumps and the like comprising,

an outer body having means forming a chamber therein,

a rotor confined in said chamber, said chamber having a chamber axis circumscribed by three equal curvilinear walls defining an equilateral chamber triangle in a plane perpendicular to the chamber axis,

said three chamber walls being convex with respect to the chamber axis,

said rotor being generally elongated, of length equal to the span of the chamber along the bisector of any angle of said equilateral triangle and having a rotor axis centrally located therein and parallel to said chamber axis, and

means for pivotally supporting said rotor in said chamber including:

a longitudinal slot in the rotor,

a key sliding in the slot and having a key axis parallel to the chamber axis and

means attached to the key and engaging the outer body for causing the key axis to move along an orbital path around the chamber axis and at the same time rotate on the key axis,

so that the rotor rotates on the rotor axis and the rotor axis moves around the chamber axis,

whereby the rotor rotates continuously in one direction, closing successively with said walls six times with each revolution of the rotor on the rotor axis.

3,996,902
WASTE-GAS SUPPRESSOR FOR INTERNAL-COMBUSTION ENGINES

Toyosuke Ri, 1-3, 1-chome, Satonaka-cho,, Nishinomiya, Hyogo; Sachio Yasuda, 25-144, Kitadaimotsu-cho,, Amagasaki, Hyogo, and Sadamu Tohdoh, 66-17, 2-chome,, Syohwadohri, Amagasaki, Hyogo, all of Japan

Filed May 14, 1974, Ser. No. 469,813

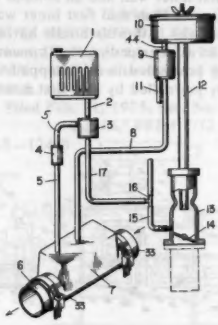
Claims priority, application Japan, May 15, 1973, 48-54233

Int. Cl.² F02D *19/00*

U.S. Cl. 123—25 B **14 Claims**

1. A water-gas suppressor for internal-combustion engines, the latter including a carburetor (13), a combustion chamber and an exhaust pipe (6); the suppressor comprising, in combination, a water tank (1); a regulator (3) for adjusting the flow of the water supplied from said tank by an adjusting valve (24) operated by negative pressure generated by said carburetor; a steam generator (7) for evaporating the water, that is supplied from said regulator, by the heat of said exhaust pipe in a sealed space (31); and a steam buffer (9) provided between said generator and an air cleaner (10), for leading only the pure

steam generated in said generator into said air cleaner; wherein said generator has attached thereto a conduit (5) and a steam tube (8) which both lead to said sealed space, respectively from said water tank by way of said regulator, and from said air cleaner by way of said steam buffer; said conduit leads



to a short tube (36), one end of which forms an aperture (38) of a small diameter while its other end leads to the bottom of said sealed space; and said steam tube leads to another short tube (39), one end of which, of a larger diameter than that of the first-named short tube, leads to the top of said sealed space.

3,996,903

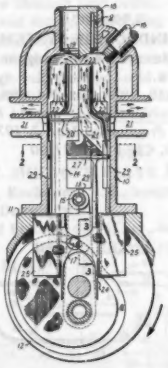
INTERNAL COMBUSTION ENGINE

Ferenc Cseh, 37 Passaic St., Passaic, N.J. 07055

Filed June 1, 1971, Ser. No. 148,598

Int. Cl.² F02B *33/12*

U.S. Cl. 123—74 AA **2 Claims**



1. A pump, in a two-stroke internal combustion engine, with the character described comprising:

A. a working cylinder

1. has an intake port between the ends thereof
2. having a transfer port at the upper end
3. has an exhaust port between the ends thereof

B. a working primary piston, stepped tube type

1. reciprocable in said working cylinder, between upper and lower position
2. has means to open the said intake port
3. closes the said intake port at lower position
4. opens the said transfer port at lower position
5. opens the said exhaust port at lower position

C. a secondary piston

1. fits in the said working primary piston
2. fits in the said working cylinder
3. reciprocable, substantially under the said intake port, between upper and lower position

D. a means

1. provides a timed relation between the movements of said working primary piston and said secondary piston

E. and means mounting said working primary piston in said working cylinder for reciprocal motion between a top dead center position in which a fresh charge admitted over the said secondary piston through the said intake port and a bottom dead center position in which the essentially noncompressed said fresh charge over the said secondary piston passing through a transfer passage and said transfer port to aid in expelling exhaust gases through said exhaust port.

3,996,904

THROTTLE POSITIONER

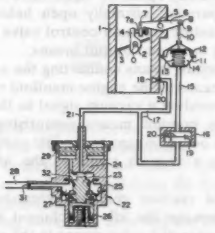
Shinzo Kobuki, and Masaru Hase, both of Toyota, Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Filed July 30, 1975, Ser. No. 600,140

Claims priority, application Japan, Mar. 20, 1975, 50-33803

Int. Cl.² F02D *11/08*

U.S. Cl. 123—103 R **5 Claims**

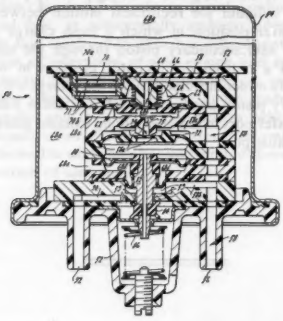


1. A throttle positioner comprising a port to detect intake vacuum, a diaphragm means, a conduit means which connects said port and a diaphragm chamber of said diaphragm means, said conduit means including a means to delay transmission of vacuum, a throttle positioning lever adapted to be driven by said diaphragm means so as to rotate between first and second rotary positions, and a throttle driving lever mounted on a rotary shaft of a throttle valve and adapted to engage a tip of said throttle positioning lever so as to hold return of the throttle valve at a predetermined opening position when said throttle positioning lever is in said first rotary position while disengaging from said tip of said throttle positioning lever so as to permit full return of the throttle valve to an idling position when said throttle positioning lever is in said second rotary position, the improvement which comprises a vacuum control valve which selectively opens an intermediate portion of said conduit means to the atmosphere, said vacuum control valve being controlled by delivery air pressure of an air pump driven by an engine so as to open when the air pressure is above a predetermined level.

3,996,905
VACUUM CONTROLS FOR INTERNAL COMBUSTION ENGINES

Gary D. Dawson, Rochester, Mich., assignor to Chrysler Corporation, Highland Park, Mich.

Filed Nov. 25, 1974, Ser. No. 526,499
Int. Cl.² F02B *33/00;* **F02M** *7/00*
U.S. Cl. 123—119 A **2 Claims**



1. A vacuum control system for internal combustion engines, comprising:

vacuum operated means associated with an engine, the vacuum operated means being adapted to provide vacuum signals to the engine for control purposes,

engine manifold vacuum source means operable to provide a vacuum input to the vacuum operated means, and

vacuum delay means operable to delay transmission of the vacuum input provided by the manifold vacuum source means to the vacuum operated means as a vacuum output for a predetermined period of time after engine start-up,

carburetor idle enrichment means comprising a vacuum operated, normally open, air bleed valve means,

temperature operated, normally open below a predetermined temperature, vacuum control vaive means including operating input and output means,

first vacuum conduit means connecting the vacuum control valve input means to the engine manifold vacuum source means for providing a vacuum signal to the valve,

second vacuum conduit means comprising the vacuum control valve output means to the idle enrichment means for providing a vacuum signal to the idle enrichment means, and

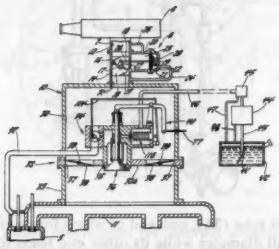
normally closed vacuum response vacuum relief means connected between the idle enrichment means and the temperature operated valve means in the second vacuum conduit, the relief means being operable to an open condition by the vacuum signal provided by the vacuum delay means.

3,996,906
CONTROLLED EXHAUST GAS FUEL ATOMIZING NOZZLE

William C. Bubniak; William R. Matthes, both of Troy, and Neil A. Schilke, Rochester, all of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Apr. 24, 1975, Ser. No. 571,417
Int. Cl.² F02M *25/00*
U.S. Cl. 123—119 A **5 Claims**

1. A fuel atomizing nozzle for use in supplying a combustible induction mixture to an internal combustion engine, said fuel atomizing nozzle comprising a housing means having an aeriform fluid supply passage therethrough terminating at an annular inlet port on a first side thereof, said annular inlet port defining an annular valve seat adjacent said first side, said housing means having a stepped bore therethrough extending from a second side opposite said first side to said supply passage closely adjacent to and concentric with said inlet port, said stepped valve guide bore defining in sequence an annular first inner wall of a first diameter extending from said second side, an annular second inner wall of substantially greater diameter than said first inner wall and an annular third inner wall of a diameter greater than said first inner wall and less than said second inner wall, a throttle-nozzle having an annular conical head and an axial extending stem concentric therewith, said stem being positioned in said stepped valve guide bore and reciprocally journalled by said first inner wall with

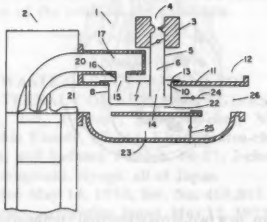


said stem extending out from said second side means, throttle actuating means operatively connected to said stem to effect operation of said throttle-nozzle whereby said head is moved relative to said valve seat to control the discharge of fluid through said inlet port, said stem defining with said second inner wall a first annulus chamber for fuel and defining with said third inner wall a reduced size annulus chamber for fuel and, a fuel passage means including a fuel pressure regulator connected at one end to said first annulus chamber and connectable at its other end to a source of liquid fuel under pressure.

3,996,907
FUEL INDUCTION SYSTEM

Frederick J. Marsee, Clawson, Mich., assignor to Ethyl Corporation, Richmond, Va.

Filed Aug. 20, 1974, Ser. No. 498,951
Disclosure was also published under second Trial Voluntary Protest Program on Mar. 2, 1976
Int. Cl.² F02M *31/00*
U.S. Cl. 123—122 AC **15 Claims**



1. A fuel induction system for a spark-ignited multicylinder internal combustion engine comprising in combination a carburetor, an intake manifold, an exhaust gas conduit and an evaporation container having an inlet and an outlet, said exhaust gas conduit having an opening in its side wall adapted to sealably engage and hold said evaporation container such that a non-perforate portion of said container extends into said exhaust conduit, said carburetor having at least one primary barrel wherein gasoline is atomized into air to form a primary air/fuel mixture, first passage means connecting said primary barrel to said container inlet adapted to deliver all of

said primary air/fuel mixture into said container, and second passage means connecting said container outlet to said intake manifold adapted to deliver said primary air/fuel mixture from said container into said intake manifold.

3,996,908

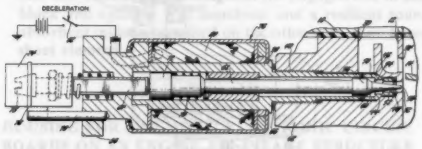
FUEL SHUT-OFF VALVE ASSEMBLY

Reed M. Brown, III, Fairport, and Earl R. Fischer, Rochester, both of N.Y., assignors to General Motors Corporation, Detroit, Mich.

Filed Feb. 21, 1975, Ser. No. 551,605

Int. Cl.² F02M 7/12

U.S. Cl. 123—124 B **2 Claims**



1. A fuel shut-off valve assembly for use in an internal combustion engine carburetor having a fuel passage, said fuel shut-off valve assembly comprising a hollow body adapted to form a portion of said fuel passage and defining an orifice in said fuel passage and an annular seat in said fuel passage spaced from said orifice, a valve member disposed in said fuel passage within said hollow body and having a tapered metering portion disposed in said orifice and a closure portion engageable with said seat, a stop member carried by said body, said valve member further having a shank portion engageable with said stop member, means for operating said valve member to disengage said closure portion from said seat and to engage said shank portion with said stop member, said stop member being adjustable relative to said orifice to control the disposition of said tapered portion in said orifice and thereby control fuel flow through said orifice when engaged by said shank portion, and means for moving said valve member to disengage said shank portion from said stop member and to engage said closure portion with said seat to thereby reduce fuel flow through said passage, said body having means for securing said assembly to said carburetor.

3,996,909

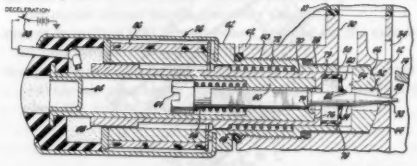
FUEL SHUT-OFF VALVE ASSEMBLY

Earl R. Fischer, Rochester, N.Y., assignor to General Motors Corporation, Detroit, Mich.

Filed Feb. 21, 1975, Ser. No. 551,606

Int. Cl.² F02M 7/12

U.S. Cl. 123—124 B **2 Claims**



2. A fuel shut-off valve assembly for use with an internal combustion engine carburetor having an induction passage for air flow to the engine, a throttle disposed in said induction passage for controlling flow therethrough, and a fuel passage having a discharge port opening into said induction passage downstream of said throttle, said fuel shut-off valve assembly comprising a hollow body adapted to form a portion of said fuel passage and defining a seat in said passage adapted to surround said port, a guide member disposed within said body, a valve having a threaded portion supported within said guide member and a tapered metering portion adapted for disposition within said port, said valve being adjustable within said guide member to locate said tapered metering portion at a desired position within said port and thereby control fuel flow through said port, a sleeve member mounted about and slidable relative to said guide member within said body and having a closure portion engageable with said seat, said sleeve member being reciprocable between a first position wherein said closure portion is disengaged from said seat to permit fuel flow through said passage and a said second position wherein said closure portion is engaged with said seat to reduce fuel flow through said passage, spring means biasing said sleeve member to one of said positions, and a coil associated with said sleeve member and energizable for moving said sleeve member from said one position to the other of said positions against the bias of said spring means.

3,996,910

FUEL INJECTION SYSTEM FOR INTERNAL COMBUSTION ENGINE

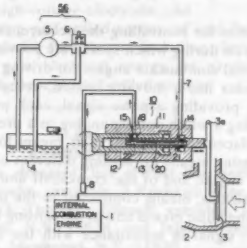
Masaaki Noguchi, Nagoya; Yukiyasu Tanaka, Okazaki, and Taro Tanaka, Chiryu, all of Japan, assignors to Nippon Soken, Inc., Nishio, Japan

Filed July 17, 1975, Ser. No. 596,744

Claims priority, application Japan, July 29, 1974, 49-86776; Nov. 29, 1974, 49-137121

Int. Cl.² F02M 39/00

U.S. Cl. 123—139 AW **14 Claims**



1. A fuel injection system for an internal combustion engine having at least one cylinder comprising,

a sensor for detecting the flow rate of intake air;

a fuel delivery device for delivering the fuel under a predetermined pressure;

a fuel metering device for metering the fuel delivered from said fuel device in association with said sensor; and

at least one fuel injection nozzle for injecting the fuel delivered from said fuel metering device into the corresponding cylinder of the engine, said fuel injection system being characterized in that, said fuel metering device comprises,

a. a housing with at least one fuel outlet communicated with said fuel injection nozzle;

b. a rotor rotatably fitted into said housing for rotation in synchronism with the rotation of the engine;

c. a control member fitted into said housing and engaging said rotor, said control member being operatively coupled to said sensor so as to be displaced in the axial direction relative to said rotor in response to the detecting operation of said sensor;

said rotor and said control member being provided with at least one slot and at least one slit, respectively, said at least one slot and said at least one slit being communicated with each other through an overlapped area between the former and the latter, said overlapped area being controlled by the relative movement between the rotor and the control member, the fuel being metered

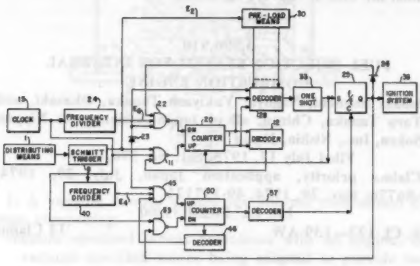
through said overlapped area, and said metered fuel being intermittently distributed to said outlet formed in said housing in response to the rotation of the rotor.

3,996,911

MEANS AND METHOD FOR CONTROLLING THE OCCURRENCE AND THE DURATION OF TIME INTERVALS DURING WHICH SPARKS ARE PROVIDED IN A MULTICYLINDER INTERNAL COMBUSTION ENGINE

Robert E. Canup, Chester, Va., assignor to Texaco Inc., New York, N.Y.

Filed Dec. 19, 1974, Ser. No. 534,252
Int. Cl.² F02P *5/04, 1/00*
U.S. Cl. 123—148 E **15 Claims**



1. A system for controlling the occurrence and duration of time intervals during which sparks are provided in a multicylinder internal combustion engine for driving a crankshaft and each cylinder has a movable piston, comprising distributor means for providing a pulse signal, each pulse in the pulse signal having a width corresponding to a predetermined rotational displacement of a crankshaft, means for providing clock pulses, sensing means for sensing different operating parameters of an engine and of the crankshaft and providing corresponding signals, means connected to the distributor means, to the timing pulse means and to the sensing means for providing a start signal in accordance with the sensed parameter signals, with the clock pulses, and with the pulse signal from the distributor means, means connected to the distributor means and to the timing pulse means for providing an end signal in accordance with the clock pulses and the pulse signal from the distributor means, and means connected to the start signal means and to the end signal means for providing sparks to cylinders in a predetermined manner in accordance with the start and the end signals so as to control the occurrence and the duration of the spark time intervals during which sparks are provided to the cylinders.

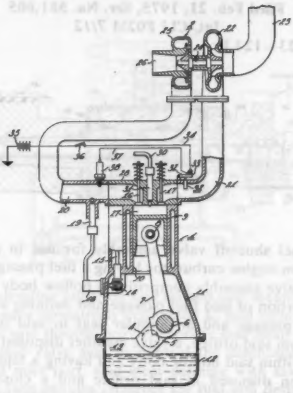
3,996,912

LOW COMPRESSION RATIO DIESEL ENGINE

Alexander Dreisin, Olympia Fields, and Floyd G. West, Park Forest, both of Ill., assignors to Allis-Chalmers Corporation, Milwaukee, Wis.

Continuation of Ser. No. 141,021, May 6, 1971, abandoned, which is a continuation of Ser. No. 692,746, Dec. 22, 1967, abandoned. This application Sept. 11, 1975, Ser. No. 612,334
Int. Cl.² F02N *17/00*
U.S. Cl. 123—179 H **21 Claims**

1. A diesel engine having a compression ratio of less than 14 to 1 including, an automatic compression temperature control system operating to insure that the temperature of the air charge in the combustion chamber near the end of the compression stroke is of sufficient magnitude to achieve complete combustion comprising, an intake manifold supplying air atomized fuel and combustion gases to the combustion chamber, an auxiliary fuel injector on said intake manifold injecting atomized fuel into the intake manifold, auxiliary fuel injector drive means continuously operating said injector during engine operation, a transducer sensing means sensing an engine temperature which normally indicates a low engine compression end temperature, means supporting said transducer sensing means on said engine for sensing the sensed engine temperature, an ignition system connected to said transducer sensing means including ignition means igniting the atomized fuel in the intake manifold in response to the presence of the sensed engine temperature normally indicating a low engine



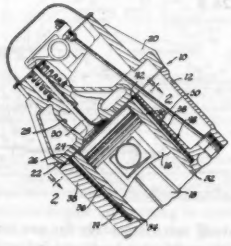
compression end temperature to provide precombustion of the atomized fuel for raising intake air temperature and compression end temperatures only during starting low load and speed conditions, a supercharger supplying air to the intake manifold, supercharger drive means on said engine driving said supercharger from engine generated energy for effectively precompressing intake air and raising its temperature and the engine compression end temperature for complete combustion during medium and high load and speed conditions of the engine.

3,996,913

ENGINE WITH INTERNAL SOUND ATTENUATION BARRIER

Nshan Hamparian, Brighton, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Sept. 29, 1975, Ser. No. 617,593
Int. Cl.² F01B *31/08*
U.S. Cl. 123—198 R **4 Claims**



1. An internal combustion engine comprising
a cylinder block having side walls terminating in an end face and defining a cavity open through said end face,
a cylinder formed by a wall in said block cavity and having an outer surface, a major portion of said surface being spaced from said block walls,

a cylinder head mounted on said block end face and closing one end of said cylinder and the open end of said cavity,

a piston reciprocably movable in said cylinder and defining with said cylinder and cylinder head a variable volume combustion chamber at said cylinder closed end, and

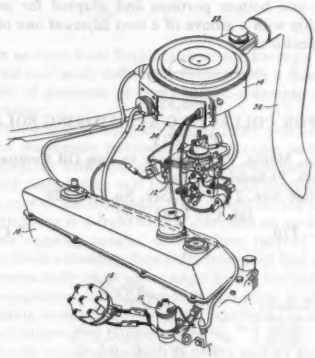
a sound attenuation barrier in said cavity between opposing spaced portions of said cylinder block side wall and cylinder wall members to reduce the transmission of sound therebetween, said barrier being insertable through the open end of said cavity when said cylinder head is removed and engaging one of said block side wall and cylinder wall members while being spaced from the other of said members, said barrier comprising a laminated material including a supporting base sheet element having one side thereof mounted against the engaged one of said block and cylinder wall members, and a resilient sound absorbent material retained on the other side of said base sheet element.

3,996,914

HOUSING FOR MOUNTING ELECTRONIC CIRCUIT BOARDS ON AN ENGINE AIR INTAKE STRUCTURE

Frederick William Crall, Farmington, and Lawrence William Tomczak, Sterling Heights, both of Mich., assignors to Chrysler Corporation, Highland Park, Mich.

Continuation of Ser. No. 587,193, June 13, 1975, abandoned, and a continuation-in-part of Ser. No. 570,540, April 22, 1975.
This application Mar. 18, 1976, Ser. No. 668,027
Int. Cl.² F02B *77/00*
U.S. Cl. 123—198 E **29 Claims**



1. In an engine having an induction air intake system including an air filter housing having a cylindrical side wall, the combination with said air filter housing of:

an electronic circuit board housing containing at least one electronic circuit board assembly therein;

means mounting said circuit board housing on the side wall of said air filter housing; and

means communicating the interiors of said two housings to provide air circulation within said circuit board housing when the engine is operated.

3,996,915

ENGINE SELECTIVELY UTILIZING HYBRID THERMODYNAMIC COMBUSTION CYCLES

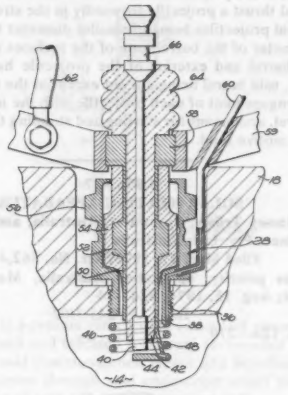
Mihai C. Demetrescu, Irvine, Calif., assignor to Resonance Motors, Inc., Monrovia, Calif.

Filed Nov. 5, 1973, Ser. No. 413,070
Int. Cl.² F02B *19/10*
U.S. Cl. 123—32 SJ **4 Claims**

1. An injector-ignition device, as for use in an internal-combustion engine, comprising:

a high-voltage electrode adapted to receive electric power for producing an ignition spark;

body means insulated from said high-voltage electrode for defining a spark gap in combination with said high-voltage electrode and adapted to be connected to a reference level of potential;



a fuel passage means affixed to said body means for passing fuel to said engine and including a coiled section contiguous to said high-voltage electrode; and

means for heating said coiled section of said fuel passage means to vaporize fuel therein including electrical connections to pass electrical energy for producing said ignition spark through said coiled section.

3,996,916

RAPID FIRE GUN

Wilbur R. Koehn, deceased, late of Port Washington, N.Y.; Elizabeth M. Koehn, executrix, 2 Henhawk Lane, Huntington, N.Y. 11743; Theodore Ellenoff, executor, 1136 Fifth Ave., New York, N.Y. 10028, and John H. Detwiler, 71 Ridge Crescent, Manhasset, N.Y. 11030

Filed May 21, 1968, Ser. No. 730,736
Int. Cl. F41b *11/02*; **F41c** *21/00, 25/02*
U.S. Cl. 124—72 **27 Claims**

1. A self-contained gun adapted to be carried on the person for firing projectiles at a rapid rate comprising a source of high pressure motive fluid, a magazine, a package of projectiles adapted to be inserted into said magazine as a cartridge, an outlet from said magazine and package of a width greater than the width of the projectiles and having opposed walls inclined to a medial plane at an acute angle and of increasing width outwardly from the outlet, a chamber adjacent the magazine having a breech opening in alignment with the outlet from the package and magazine, a barrel adapted to be held in the hands, a flexible tube connecting the outlet from the chamber to one end of the barrel, means connecting said source of motive fluid to the magazine for flow into the chamber and

through the flexible tube and barrel in a continuous stream, said chamber at the rear of the breech opening having a surface engaged by the rearward end of the projectile for advancing each projectile forwardly into the barrel as it enters the chamber with the pressure fluid and a peripheral wall at the forward end of the breech engaged by the projectile as it is moved forwardly by the surface to shut off free flow of motive fluid and thrust a projectile forwardly in the stream of motive fluid, said projectiles being of smaller diameter than the internal diameter of the barrel, one of the surfaces of the interior of the barrel and exterior of the projectile having a rifling thereon, said barrel being curved except at the muzzle end to insure engagement of each projectile with the interior wall of the barrel, and means for starting and stopping the continuous flow of motive fluid.

3,996,917

SOLAR HEATING APPARATUS

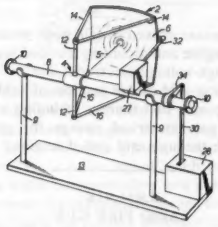
John Massey Trihey, Bayswater, Australia, assignor to Malz Nominees Pty. Ltd., Australia

Filed Mar. 27, 1975, Ser. No. 562,425

Claims priority, application Australia, Mar. 27, 1974, 7059/74; Aug. 15, 1974, 8541/74

Int. Cl.² F24J *3/02*

U.S. Cl. 126—270 **11 Claims**



1. Solar heating apparatus for heating a heat transfer medium comprising a support structure, a solar energy absorbing surface which is at least partly spherical arranged to transmit heat to a heat transfer medium, focussing means mounted on said support structure for focussing solar energy upon the solar energy absorbing surface, tracking means for tracking movement of the sun and for rotating the focussing means relative to the support structure about first and second mutually perpendicular axes to maintain the solar energy focussed upon the solar energy absorbing surface, and support means for said absorbing surface, said support means being fixed relative to said focussing means and mounting said absorbing surface in a fixed location relative to said support structure and immovable relative thereto and such that said first and second axes intersect at the geometric center of said absorbing surface, said support means including concave surfaces which are of complementary configuration to said absorbing surface and which surround the spherical part of said absorbing surface.

3,996,918

SOLAR ENERGY COLLECTOR UNIT

Melvin Randolph Quick, 889 Riffle Ave., Rahway, N.J. 07090

Filed July 19, 1974, Ser. No. 490,109

Int. Cl.² F24J *3/02*

U.S. Cl. 126—270 **6 Claims**

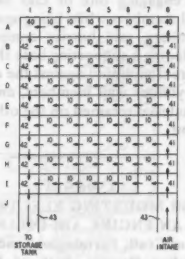
1. A solar energy collector unit comprising

a top portion, a plurality of side portions and a bottom portion,

a single cavity defined by said top, side and bottom portions said cavity adapted for the entrapment of said solar energy and for the passage therethrough of air to be heated by any said entraped solar energy in said cavity,

one of said side portions defining an output port through which said air to be heated may pass out of said entrapment cavity in contact with said defined output port, and

at least one other of said side portions defining an input port through which said air may pass into said entrapment cavity in contact with said defined input port, said input port having a shape adapted for mating relationship with an output port of a next adjacent one of said solar collector units, and



wherein a third side portion of said solar collector unit defines a groove along an outside surface thereof, said groove being parallel to said top and bottom portions, and wherein

a fourth side portion of said solar collector unit defines a lip along an outside surface thereof, said lip being parallel to said top and bottom portions and adapted for mating relationship with a groove of a next adjacent one of said solar collector units.

3,996,919

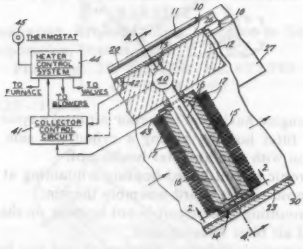
SYSTEM FOR COLLECTING AND STORING SOLAR ENERGY

Peter S. Hepp, Media, Pa., assignor to Sun Oil Company of Pennsylvania, Philadelphia, Pa.

Filed Nov. 21, 1975, Ser. No. 634,229

Int. Cl.² F24J *3/02*

U.S. Cl. 126—270 **7 Claims**



1. A solar energy collection and heat storage system comprising:

a. means for absorbing the heat from the sun;

b. a plurality of heat pipes, each having a first end mounted to the solar heat absorbing means;

c. means, surrounding the free end of each heat pipe, for storing the heat collected by the solar heat absorbing means and conducted to the free end of each heat pipe through the heat pipe itself, said storage means having an uninsulated and heat conductive outside surface to enable the heat stored to be conducted to the surrounding space; and

d. means, responsive to the temperature of the solar heat absorbing means being less than the temperature of the

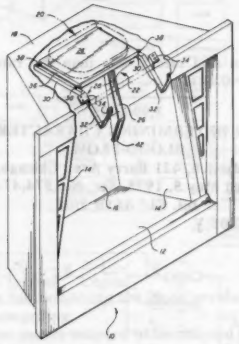
heat storage means, for preventing the conduction of heat through the heat pipes from the heat storage means to the heat absorber means, so that the heat stored in the heat storage means is not lost to the heat absorbing means.

3,996,920

FIREPLACE DAMPER CONSTRUCTION

George M. Andrews, Syracuse, N.Y., assignor to Vega Industries, Inc., Syracuse, N.Y.

Filed Jan. 16, 1976, Ser. No. 649,858
Int. Cl.² F23L *13/06*
U.S. Cl. 126—285 A **9 Claims**



1. In an open front fireplace structure having a hearth floor, side and rear walls defining a firebox with a flue opening for exhaust of products of combustion, a damper construction comprising:

a. a substantially flat plate having front, rear and side edges for movement between fully covering and uncovering positions with respect to said flue opening, one side of said plate facing said firebox in both positions;

b. a pair of parallel guide tracks each having first portions extending in a front to rear direction on each side of said flue opening parallel to the plane thereof, and second portions extending forwardly from said first portions and downwardly at an acute angle to the horizontal;

c. engagement means by which said plate is supported for sliding movement upon said tracks between said covering and uncovering positions; and

d. handle means attached at a first end to said plate and having a second end manually engagable to effect movement of said plate.

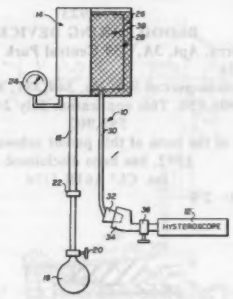
3,996,921

METHOD AND APPARATUS FOR ENDOSCOPY

Robert S. Neuwirth, Bronx, N.Y., assignor to Pharmacia Inc., Piscataway, N.J.

Filed Apr. 17, 1975, Ser. No. 569,067
Int. Cl.² A61B *1/00*
U.S. Cl. 128—2 R **26 Claims**

1. An apparatus for use in endoscopic examination of a hollow internal organ comprising an endoscope for viewing the interior of said organ; and means operatively connected to said endoscope for infusing a pressurized viscous fluid into the interior of said organ through said endoscope for minimizing distortion of an image of said organ interior viewable through said endoscope, said infusing means comprising an inflatable circumferential cuff, a self-contained sterile packet reservoir for said viscous fluid, said viscous fluid being an optically clear innocuous liquid having a predetermined viscosity and a predetermined optical density dependent on said organ to be endoscopically examined, said cuff comprising means for removably retaining said packet, said retained packet being circumferentially surrounded by said cuff and comprising means in communication with said endoscope for enabling flow of said pressurized viscous fluid therethrough to said endoscope; and means for controllably inflating said surrounding cuff to a presure sufficient to cause said viscous fluid to be pressurized and released from said surrounded packet reservoir into said communication means and be infused into said organ interior through said endoscope under the controlled pressure of said inflated surrounding cuff.

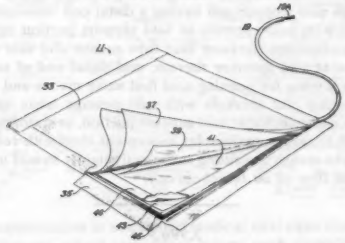


3,996,922

FLEXIBLE FORCE RESPONSIVE TRANSDUCER

Raymond B. Basham, Fort Worth, Tex., assignor to Electronic Monitors, Inc., Fort Worth, Tex.

Division of Ser. No. 389,268, Aug. 17, 1973, Pat. No. 3,898,981, which is a continuation-in-part of Ser. No. 176,983, Sept. 1, 1971, Pat. No. 3,760,794, which is a continuation-in-part of Ser. No. 97,737, Dec. 14, 1970, abandoned. This application May 19, 1975, Ser. No. 578,883
The portion of the term of this patent subsequent to Sept. 25, 1990, has been disclaimed.
Int. Cl.² A61B *5/08*
U.S. Cl. 128—2 R **4 Claims**



1. A flexible force responsive means for placement beneath a patient or patient support for sensing the respiration of a patient, comprising in combination:

two electrically conductive flexible metallic sheet electrodes, a center electrically conductive flexible metallic sheet electrode positioned between said two sheet electrodes,

a synthetic resin, electrostatically charged, flexible sheet located between adjacent metallic sheets of conductive electrodes to form alternate layers with the electrically conductive sheets,

said flexible sheets of electrically conductive material being sensitive to changes in force applied thereto and caused by the respiration of a patient,

an electrical conductor connected to the center sheet electrode,

an electrical conductor connected to the two outer sheet electrodes, and

flexible nonconductive material surrounding and covering said outer electrodes of flexible sheets of conductive material.

3,996,923

BLOOD TAKING DEVICE

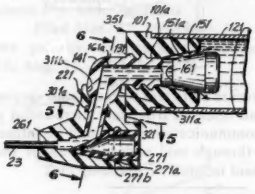
Luis A. Guerra, Apt. 3A, 239 Central Park West, New York, N.Y. 10024

Continuation-in-part of Ser. No. 344,387, March 23, 1973, Pat. No. 3,906,930. This application July 24, 1975, Ser. No. 598,902

The portion of the term of this patent subsequent to Sept. 23, 1992, has been disclaimed.

Int. Cl.² A61B 5/14

U.S. Cl. 128—2 F **10 Claims**



1. An improvement in a blood-taking device for taking blood from a blood vessel, wherein said improvement comprises a support portion and a container portion, said support portion comprising a cannula having a sharp distal end and a proximal end, said support portion having a passage therethrough, the distal end of said passage tightly receiving the proximal end of said cannula, first valve means seated in the proximal end of said passage for closing same, said support portion having an aperture therein connecting with said passage, said first valve means normally closing the connection between said aperture and said passage, said container portion comprising an evacuable container having a mouth, a stopper in said mouth, and tube means having a proximal end passing through said stopper and having a distal end removably connected with said aperture in said support portion to form a tight connection between said tube means and said support portion at said aperture therein, said distal end of said tube means serving for opening said first valve means and thereby connecting said aperture with said passage when said tube means is connected to said support portion, said stopper being affixed to said container for movement therewith relative to said tube means and fitting sufficiently tightly to said mouth to prevent flow of air therebetween.

3,996,924

OCCLUSIVE IMPEDANCE PHLEBOGRAPH AND METHOD THEREFOR

H. Brownell Wheeler, 540 Salisbury St., Worcester, Mass. 01609

Filed June 19, 1974, Ser. No. 481,115

Int. Cl.² A61B 5/02

U.S. Cl. 128—2.05 V **16 Claims**

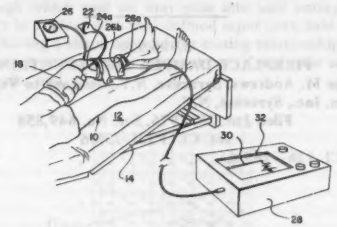
1. A method of assessing the patency of the venous system in an animal body limb, comprising the steps of

A. blocking off the venous return to the heart from the limb to be tested,

B. maintaining said blockage for a period of time sufficient to accumulate excess blood in said limb portion,

C. releasing said blockage and measuring the rate of venous outflow from said limb occurring within a defined time interval in response to said release, and

D. registering said system as healthy when said rate is greater than the rate defined by (0.60 VC + 0.48), where VC is the venous capacitance, and registering said limb as diseased when said rate is less than the rate defined by (0.20VC + 0.14).



3,996,925

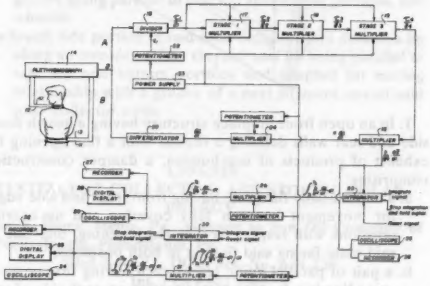
SYSTEM FOR DETERMINING CHARACTERISTICS OF BLOOD FLOW

Ljubomir Djordjevich, 421 Barry Ave., Chicago, Ill. 60657

Filed May 5, 1975, Ser. No. 574,471

Int. Cl.² A61B 5/02

U.S. Cl. 128—2.05 V **21 Claims**



1. In a method for noninvasively measuring rate of blood flow in a section of a living body, the steps of

passing a signal Z representing impedance of said section through a first channel which includes, in series, a divider device and a multiplier device to obtain a signal (c_4/Z^n) where c_4 is a constant and n is a value of 2 or more,

passing said signal Z through a second channel which includes a differentiator to obtain the signal a (dz/dt) where a is a constant and multiplying said signals (c_4/Z^n) and a (dz/dt) in a multiplier to obtain the resulting signal $(b/Z^n) \cdot (dz/dt)$ where b is a constant and where the resulting signal represents the instantaneous rate of flow of blood in said body section.

11. In the method set forth in claim 1 the step of incorporating into the system a value for the constant b which is equivalent to

$$\frac{0.5}{16\pi^2} \cdot \frac{E(k^2-1)}{\mu s R_e} \cdot \rho^2 L^2$$

where

E is the average modulus of elasticity of the arterial walls;

k is the average ratio of outer to inner radii of the arterial walls;

μ is the viscosity of blood;

s is the average speed of propagation of pressure through the arterial walls;

R_e is the average radius of the chest of the patient being tested;

ρ is the electrical resistivity of blood; and

L is the distance between the points on the body section between which the impedance is taken.

3,996,926

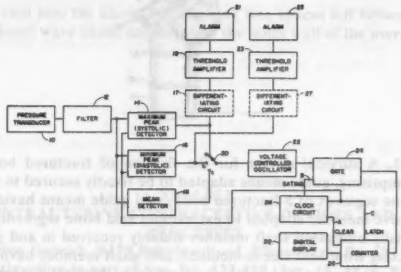
BLOOD PRESSURE MONITORING SYSTEM

Michael R. Birnbaum, New Brighton, Minn., assignor to Medtronic, Inc., Minneapolis, Minn.

Continuation of Ser. No. 486,855, July 9, 1974, Pat. No. 3,893,452. This application Apr. 30, 1975, Ser. No. 573,341 The portion of the term of this patent subsequent to July 8, 1992, has been disclaimed.

Int. Cl.² A61B *5/02*

U.S. Cl. 128—2.05 A **5 Claims**



1. A system for monitoring the blood pressure of a patient, said system comprising:

a. transducer means adapted to be coupled to the vascular system of a patient for providing an output indicative of the patient's blood pressure;

b. filter means coupled to said transducer means for removing a substantial portion of the undesired frequency components of the transducer means output of a frequency high with respect to the patient's heartbeat, while passing a substantial portion of the signal components of the transducer means output corresponding to the patient's heart rate;

c. systolic detector means responsive to the output of said filter means for providing a first signal indicative of the maximum magnitude of the patient's blood pressure;

d. diastolic detector means responsive to the transducer means output for providing a second output indicative of the minimum magnitude of the patient's blood pressure;

e. display means for displaying an indication of the patient's blood pressure;

f. switch means for selecting one of the first and second outputs to be displayed by said display means; and

g. clock means for generating and applying a free-running clock signal to each of said systolic detector means and said diastolic detector means to reset each of said means in preparation for sensing a further maximum and minimum magnitude of the patient's blood pressure.

3,996,927

BLOOD PRESSURE MONITOR LEVELING DEVICE

Ulrich Anton Frank, Princeton, N.J., assignor to Hoffmann-La Roche Inc., Nutley, N.J.

Filed June 27, 1975, Ser. No. 591,256

Int. Cl.² A61B *5/02*

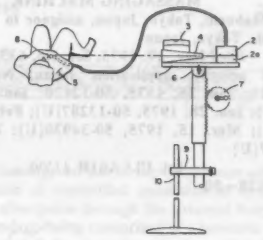
U.S. Cl. 128—2.05 D **6 Claims**

1. An arrangement for providing at least one pressure indicating means, such as a transducer, used in atrial and/or arterial blood pressure determination, at the same level as a preestablished remote reference point on a patient whose blood pressure is to be determined, comprising:

a base adjustable to provide a surface which is level with the horizontal and having removably mounted thereto said at least one pressure indicating means;

first means operatively connected to said base for controllably varying the elevation of the base relative to said remote reference point without disturbing the leveling the said base; and

second means adjustably mounted on said base relative to said surface thereof for determining that a predetermined portion of said at least one pressure indicating means is



elevated level with said remote reference point on the patient, said second means including third means adjustably mounted relative to said surface of said base for indicating said predetermined portion of said at least one pressure indicating means is elevated level with said remote reference point and level indicating means fixedly mounted relative to said third means for indicating when said second means is operatively level with the horizontal.

3,996,928

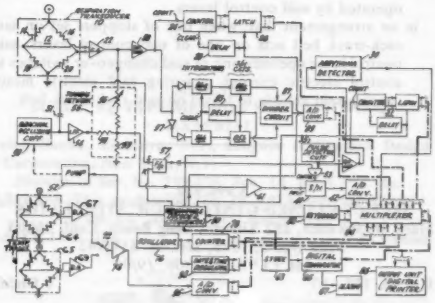
PATIENT VITAL-SIGNS AUTOMATED MEASURING APPARATUS

Alvin J. Marx, 315 College Road, Bronx, N.Y. 10471

Filed May 28, 1975, Ser. No. 581,489

Int. Cl.² A61B *5/02*

U.S. Cl. 128—2.05 A **14 Claims**



1. In combination in automated medical vital signs monitoring equipment, plural transducer means each providing an electrical signal representative of an associated monitored physical parameter, multiplexing means, signal processing means connecting each of said transducer means with inputs of said multiplexing means, output means connected to the output of said multiplexing means for providing a visable indication of said monitored, physical paramaters, and timing means connected to said multiplexing means for sequentially connecting said signal processing means to said output means, wherein one of said transducer means comprising blood pressure monitoring means for occluding an artery with a monotonically decreasing pressure and means for providing a signal indicative of the occluding pressure, and wherein another of said transducer means includes respiration sensing means for providing a signal indicative of respiration state, said signal processing means associated with said blood pressure monitoring means including correcting means responsive to the

output of said respiration monitoring transducer means for correcting the pressure signalled by said blood pressure monitoring transducer means.

3,996,929

MASSAGING MACHINE

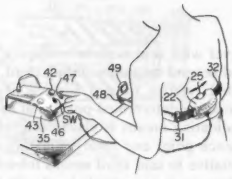
Kenichi Mabuchi, Tokyo, Japan, assignor to Mabuchi Motor Co. Ltd., Tokyo, Japan

Filed Nov. 19, 1975, Ser. No. 633,220

Claims priority, application Japan, Nov. 30, 1974, 49-138221; Jan. 28, 1975, 50-12120; Jan. 28, 1975, 50-13286[U]; Jan. 28, 1975, 50-13287[U]; Feb. 27, 1975, 50-27109[U]; Mar. 15, 1975, 50-34920[U]; Mar. 26, 1975, 50-40497[U]

Int. Cl.² A61H *11/00*

U.S. Cl. 128—58 12 Claims



1. A massaging machine, comprising:

a driving wheel for driving the vehicle of said massaging machine by holding a rack-track belt stretched in tension and by meshing with said rack-track belt;

an electric motor for rotating said driving wheel forward and backward; and

control levers provided to the front end and the rear end of said vehicle and also changeover switches respectively operated by said control levers;

in an arrangement that, when one of stoppers set on said rack-track belt acts on one of said control levers, said control lever operates one of said changeover switches to control electric current powering said electric motor causing said vehicle to travel on said rack-track belt.

3,996,930

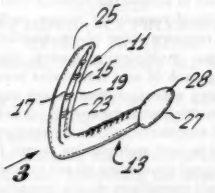
SELF-CONTAINED GYNECOLOGIC STIMULATOR

Mark W. Sekulich, 252 Ximeno, Long Beach, Calif. 90803

Filed Oct. 2, 1975, Ser. No. 618,902

Int. Cl.² A61H *7/00, 19/00*

U.S. Cl. 128—67 8 Claims



1. A self-contained gynecologic stimulator comprising:

a resilient elongated member for receipt in a vagina to form a general V-shape with one leg thereof forming a posterior leg and the other leg forming an anterior leg, said anterior leg being formed on its interior side with an elongated concave trough for receipt of the clitoris.

3,996,931

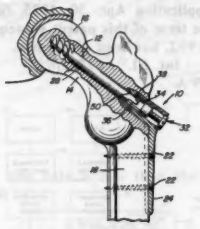
FRACTURED BONE SETTING FASTENER ASSEMBLY

George R. Callender, Jr., 4701 MacCorkle Ave., SE., Charleston, W. Va. 25314

Filed July 3, 1975, Ser. No. 593,101

Int. Cl.² A61F *5/04;* A61B *17/18*

U.S. Cl. 128—92 BA 1 Claim



1. A surgical device for the fixation of fractured bones comprising, guide means adapted to be fixedly secured to one bone segment of a fractured bone, said guide means having a sleeve member adapted to extend into said bone segment, an axially elongated shaft member slidably received in and projecting from said sleeve member, said shaft member having a bone anchoring end portion remote from the sleeve member adapted to be embedded in the other bone segment of said fractured bone, limit means mounted on an end portion of the shaft member opposite said anchoring end portion for engagement with the guide means to limit axial extension of the shaft member in one direction from the sleeve member, relatively positionable key means on the sleeve and shaft members for alternatively accommodating telescoping movement between the members and axially locking the members against relative axial movement in both directions, said key means including a projection on said sleeve member and a single pair of parallel relatively long and short grooves formed in and extending longitudinally of the shaft member and in which said projection may be selectively engaged for sliding longitudinally therealong, the end of said long groove remote from said bone anchoring end portion opening endwise outwardly of the corresponding end of said shaft member and the corresponding end of said short groove being closed and spaced slightly from the corresponding end of said shaft member, said grooves including closed ends adjacent said anchoring end portion, the last-mentioned closed end of said long groove being closer to said anchoring end portion than the closed end of the short groove, and access means including a connecting slot formed in said shaft and extending thereabout with an end thereof opening into the closed end of said short groove remote from said anchoring end portion and the other end opening into said long groove at a point spaced from the end of said shaft member remote from said anchoring end portion.

3,996,932

INTRA-UTERINE CONTRACEPTIVE DEVICE

Laszlo Kalman Csatary, 1913 Windsor Road, Alexandria, Va. 22307, and Frank Istvan Pongracz, 10833 Margate Road, Silver Spring, Md. 20901

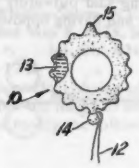
Division of Ser. No. 451,742, March 18, 1974, Pat. No. 3,933,153. This application May 15, 1975, Ser. No. 577,864

Int. Cl.² A61F *5/46*

U.S. Cl. 128—129 7 Claims

1. An intra-uterine contraceptive device comprising an annular hollow body made from a biologically inert flexible material, a fluid filling said body, a plurality of wave-like smooth rounded-off protusions formed on the outer surface of said body substantially about the entire circumference

thereof, for providing a plurality of contact regions with the inner wall of the uterus when said contraceptive device is



inserted into the uterus but allowing free spaces left between adjacent wave crests and between the inner wall of the uterus.

3,996,933

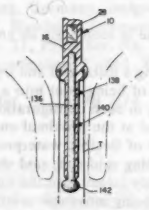
INTRAUTERINE CONTRACEPTIVE DEVICES AND PROCESSES

Morton Gutnick, 8329 Fairview Road, Elkins Park, Pa. 19117

Continuation-in-part of Ser. No. 432,435, Jan. 11, 1974, Pat. No. 3,913,573, which is a continuation-in-part of Ser. No. 294,200, Oct. 2, 1972, abandoned. This application Oct. 14, 1975, Ser. No. 621,958

Int. Cl.² A61F *5/46*

U.S. Cl. 128—130 **5 Claims**



1. A process operative over a prolonged period of time for the contemporaneous prevention of conception and the prevention, treatment or cure of venereal disease by the use of a single apparatus comprising an intrauterine contraceptive device and an integral reservoir adapted to extend into the vagina of a human female comprising the steps of:

a. Inserting into the uterus of a human female a safe and effective intrauterine contraceptive device;

b. Substantially contemporaneous with the insertion of such device, releasing into the uterus an anesthetic in a quantity sufficient to anesthetize the uterus to prevent expulsion of said device;

c. Continuously releasing said anesthetic directly into the uterus over a prolonged period of time of at least about thirty days while said device is resident in said uterus to continue to anesthetize the uterus and prevent expulsion of said device;

d. Substantially contemporaneous with the insertion of said device into the uterus, commencing the release directly into the vagina of the minimum inhibitory dosage of at least one medication for the prevention, treatment or cure of venereal disease in the human female; and

e. While said device is resident in said uterus, continuously releasing directly into the vagina the minimum inhibitory dosage of such medication over a prolonged period of time of at least about thirty days.

3,996,934

MEDICAL BANDAGE

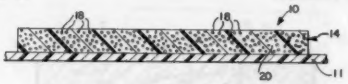
Alejandro Zaffaroni, Atherton, Calif., assignor to Alza Corporation, Palo Alto, Calif.

Filed Aug. 9, 1971, Ser. No. 169,975

The portion of the term of this patent subsequent to July 29, 1992, has been disclaimed.

Int. Cl.² A61F *7/02*

U.S. Cl. 128—268 **21 Claims**



1. A medical bandage for use in the continuous administration to circulation of controlled quantities of systemically active drugs by absorption through the external body skin or mucosa, said bandage being comprised of a laminate of: (1) a backing member defining one face surface of a bandage; bearing (2) a discrete middle reservoir containing a drug confined therein; the reservoir being formed of a material permeable to passage of drug; and wherein one or more drug release rate controlling membranes are laminated to the surface of the reservoir so as to define the other face surface of the bandage to continuously meter the flow of a therapeutically effective amount of drug to the skin or mucosa of the patient at a predetermined rate over a period of time; and (3) means to secure said bandage to the patient.

3,996,935

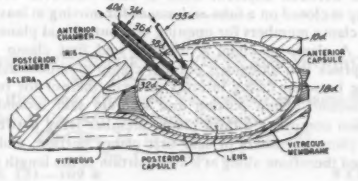
SURGICAL-TYPE METHOD FOR REMOVING MATERIAL

Anton Banko, Brooklyn, N.Y., assignor to Surgical Design Corporation, New York, N.Y.

Division of Ser. No. 799,476, Feb. 14, 1969, Pat. No. 3,732,858. This application Jan. 18, 1973, Ser. No. 324,814

Int. Cl.² A61B *17/32;* **A61M** *1/00*

U.S. Cl. 128—276 **22 Claims**



22. A method of removing cataracts, comprising; positioning within the body of an organic eye and interiorly of an organic crystalline lens capsule containing a cataract the end of a hollow elongate member having an opening at the end thereof; inserting a masticating tool through said hollow member; masticating the interior contents of said capsule; withdrawing the masticated capsular contents through said hollow member; and injecting a transparent fluid filler material into said lens capsule following withdrawal of the masticated contents thereof.

3,996,936
BODY FLUID ABSORPTION FIBER FABRIC

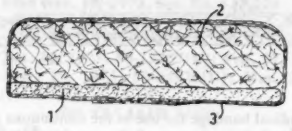
Leif Urban Roland Widlund, Pixbo; Sven Gunnar Bergdahl, Molnlycke, and Kerstin Anna Helena Strandberg, Pixbo, all of Sweden, assignors to Molnlycke AB, Goteborg, Sweden

Filed Feb. 4, 1975, Ser. No. 546,887

Claims priority, application Sweden, Feb. 15, 1974, 7402030

Int. Cl.² A61F *13/20, 13/16*

U.S. Cl. 128—287 **10 Claims**



1. Absorption products such as compresses, sanitary napkins, diapers or the like which comprise an absorption body furnished with a covering and an at least substantially moisture-impermeable layer which is provided between said body and said covering on the side of the body facing away from the user, characterized in that the at least substantially moisture-impervious layer comprises short hydrophobic fibers loosely applied and essentially unbound to one another.

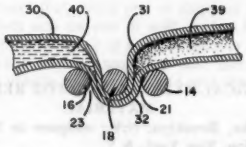
3,996,937
CLAMP FOR ANATOMICAL TUBES

Robert W. Williams, 3201 S. Maryland Parkway, Las Vegas, Nev. 89109

Filed Feb. 3, 1975, Ser. No. 546,209

Int. Cl.² A61B *17/12, 17/08*

U.S. Cl. 128—325 **21 Claims**



1. A clamp for anatomical tubes comprising at least three spaced elongated parallel clamp members with their respective elongated axes all lying along a single plane and having a space between adjacent sides of said members when said clamp is closed on a tube and means for moving at least one of said clamp members for opening said out of said plane clamp.

5. A clamp of claim 4 wherein said first clamp portion comprises two elongated parallel clamp members defining a space between facing interior surfaces thereof for receiving the second clamp portion and wherein said second clamp portion comprises a third clamp member lying between said two clamp members of said first clamp portion, and evenly spaced therefrom along at least a portion of the length thereof.

3,996,938
EXPANDING MESH CATHETER

William T. Clark, III, No. 6 Davis Blvd., New Orleans, La. 70121

Filed July 10, 1975, Ser. No. 594,706

Int. Cl.² A61M *25/00*

U.S. Cl. 128—348 **3 Claims**

1. A catheter comprising

a guide tube having an elongate flexible portion, flexible plunger slidably disposed in said tube, and having one end portion extending outwardly beyond an end of the flexible portion of said guide tube,

a rounded tip member on the outer end of said plunger,

a mesh sleeve surrounding said outwardly extending end portion of said plunger and having opposite ends respectively connected to said tip member and said end of said guide tube, and means on the other end of said tube and the other end of said plunger for manipulating the same and for pulling said tip towards said guide tube whereby to expand said mesh sleeve.

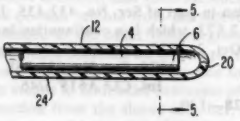
3,996,939
INTUBATION STYLETS

David S. Sheridan, Argyle, and Isaac S. Jackson, Greenwich, both of N.Y., assignors to National Catheter Corporation, Argyle, N.Y.

Filed July 22, 1975, Ser. No. 597,999

Int. Cl.² A61M *25/00*

U.S. Cl. 128—351 **4 Claims**



1. A stylet for use in intubating an endotracheal tube comprising:

a metal rod having a distal end and a proximal end, said rod being capable of being bent into a desired configuration and remaining in such configuration,

a loop in said rod at the proximal end thereof,

a tubular sheath of flexible waterproof, nonfibrous plastic material encasing said rod, said sheath having an inside diameter slightly larger than the outside diameter of said rod, said rod being moveable relative to said sheath,

said sheath being slightly longer than said rod,

the ends of the sheath being molded in a smoothly rounded, closed shape hermetically sealing the rod within the sheath, and

a frosted finish on the external surface of said sheath.

3,996,940
TOBACCO PRODUCT

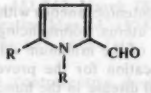
James P. Dickerson, and Donald L. Roberts, both of Winston-Salem, N.C., assignors to R. J. Reynolds Tobacco Company, Winston-Salem, N.C.

Filed Apr. 8, 1975, Ser. No. 566,083

Int. Cl.² A24B *3/12*

U.S. Cl. 131—17 R **5 Claims**

1. A tobacco product having added thereto a small amount sufficient to alter the flavor or aroma of the tobacco product of a compound having the following formula:



wherein R is a carboxyalkyl group containing from 2 to 8 carbon atoms and R' is hydrogen or an alkyl group of 1 to 4 carbon atoms.

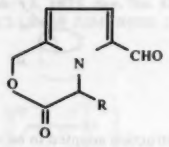
3,996,941

TOBACCO PRODUCT

Charles W. Miller; James P. Dickerson, and Charles E. Rix, all of Winston-Salem, N.C., assignors to R. J. Reynolds Tobacco Company, Winston-Salem, N.C.

Filed May 8, 1975, Ser. No. 575,483
Int. Cl.² A24B 3/12
U.S. Cl. 131—17 R 5 Claims

1. A tobacco product having added thereto a small amount sufficient to alter the flavor or aroma of the tobacco product of a compound having the following formula:



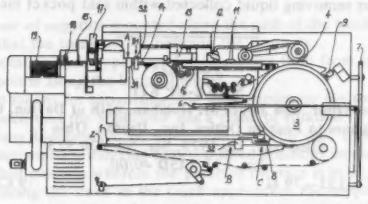
where R = hydrogen or alkyl containing up to 6 carbon atoms or aralkyl containing 7 or 8 carbon atoms.

3,996,942

ARRANGEMENT FOR DETERMINING THE MASS OF A STREAM OF TOBACCO, OR OTHER CONSTITUENT MATERIAL OF SMOKERS' PRODUCTS

Anton Baier, Hamburg, Germany, assignor to Hauni-Werke Korber & Co., KG, Hamburg, Germany

Filed Mar. 21, 1975, Ser. No. 560,991
Claims priority, application United Kingdom, Mar. 23, 1974, 13021/70
Int. Cl.² A24B 7/14
U.S. Cl. 131—21 R 29 Claims



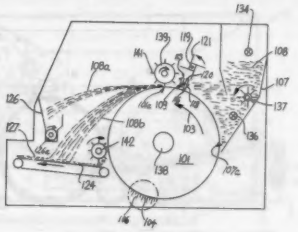
1. In a machine operative for processing tobacco, filter material or other constituent material of smokers' products, or the like, of the type wherein a stream of such material moves along a predetermined path, an arrangement for detecting the mass of the material in such stream, comprising, in combination, first circuit means operative for generating a first periodic signal having a first frequency; second circuit means operative for generating a second periodic signal having a second frequency, at least one of said circuit means being comprised of a frequency-determining capacitor structure positioned in proximity to material moving along a predetermined portion of said path and so disposed as to have a capacitance value dependent upon the mass of material penetrated by electric field lines of said capacitor structure; signal combining means for combining said first and second periodic signals to form a resulting periodic signal exhibiting a beat; and measuring means operative for providing an indication of the mass of material penetrated by electric field lines of said capacitor structure by detecting the frequency of said beat.

3,996,943

DISTRIBUTOR FOR CIGARETTE ROD MAKING MACHINES OR THE LIKE

Alfred Hinzmann, Richmond, Va., assignor to Hauni-Werke Korber & Co., KG, Hamburg, Germany

Continuation-in-part of Ser. No. 536,302, Dec. 24, 1974. This application Apr. 17, 1975, Ser. No. 569,180
Int. Cl.² A24B 7/14
U.S. Cl. 131—21 A 9 Claims



1. In an apparatus for producing and processing a homogeneous layer of fibrous particles, particularly in a distributor for shredded tobacco, the combination of a source arranged to store a supply of fibrous particles including first particles of greater weight in random distribution with second particles of lesser weight; a conveyor having means for withdrawing from said source a continuous layer of fibrous particles and for advancing said layer in a predetermined direction along an endless path located in a substantially vertical plane and having an apex, said withdrawing means coming into contact with fibrous material in a region which is located ahead of said apex, as considered in said direction, and said layer of fibrous particles having an exposed side; means for forcibly expelling at least the majority of fibrous particles from said path in the general area of said apex whereby the flight spans of said first particles are longer than the flight spans of said second particles and said first and second particles are separated from each other as a direct result of forcible expulsion of particles from said path by said expelling means; and means for homogenizing said layer intermediate said region and said expelling means, including a barrier having a first surface adjacent to and in contact with the exposed side of said layer and a second surface adjacent to said first surface, said second surface extending substantially transversely of said path and facing counter to said direction so that at least some fibrous particles at said exposed side of said layer are intercepted by and pile up at said second surface, means for moving said barrier substantially transversely of said path, and means for moving the piled-up particles in a second direction.

3,996,944

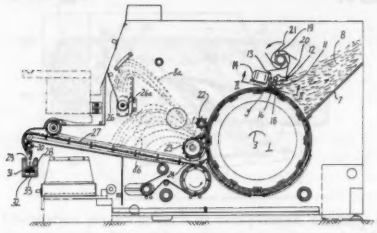
DISTRIBUTOR FOR CIGARETTE ROD MAKING MACHINES OR THE LIKE

Alfred Hinzmann, Richmond, Va., assignor to Hauni-Werke Korber & Co., KG, Hamburg, Germany

Filed Dec. 24, 1974, Ser. No. 536,302
Int. Cl.² A24B 7/14
U.S. Cl. 131—109 R 9 Claims

1. In an apparatus for producing a homogeneous layer of fibrous particles, particularly in a distributor for shredded tobacco, the combination of a source of fibrous particles; a conveyor having means for withdrawing from said source a continuous layer of fibrous particles and for advancing said layer in a predetermined direction and along a predetermined path wherein said layer has an exposed side; and means for homogenizing said layer including a barrier having a continuous uninterrupted first surface adjacent to and in contact with the exposed side of said layer, a second surface adjacent to said first surface, extending substantially transversely of said

path and facing counter to said direction so that at least some particles of said layer which extend beyond said first surface are intercepted by and pile up at said second surface to form a supply of particles immediately upstream of said first surface, and a third surface coextensive with and remote from said first surface, said second surface being disposed between said first and third surfaces, means for moving said barrier substantially transversely of said path, said first surface of said barrier having raised and recessed portions which homogenize



said layer between said first surface and said conveyor as a result of said movement of said barrier transversely of said path and allow all fibrous particles which advance beyond said second surface to move along and beyond said first surface, and refuser means for moving the surplus of piled-up particles of said supply counter to said direction, said refuser means being adjacent to said third surface so that the height of said supply of particles is at least substantially constant and equals the width of said second surface.

3,996,945

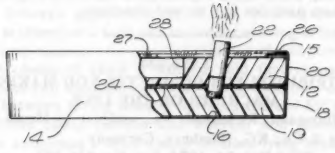
EXTINGUISHER FOR CIGARETTES OR CIGARS

James A. McDowell, 3706 W. 147th St., Hawthorne, Calif. 90250

Continuation-in-part of Ser. No. 566,010, April 7, 1975, Pat. No. 3,948,278. This application Mar. 25, 1976, Ser. No. 670,140

Int. Cl.² A24F *19/14*

U.S. Cl. 131—235 R **8 Claims**



1. A disposable receptacle for cigarettes or cigars, comprising:

top and bottom juxtaposed bodies, each formed of rigid, foamed thermoplastic polymer and having bottom, side and top surfaces;

a layer of inorganic fire-resistant material sandwiched between said bodies; and

a housing for containing said bodies and permitting a top surface portion of said top body to be exposed for extinguishment by penetration of the lit end of said cigarette or cigar.

3,996,946

RINSE BIB CONSTRUCTION

Virginia L. Craig, 304 Tuscarawas Ave., NW., New Philadelphia, Ohio 44663

Filed Mar. 24, 1976, Ser. No. 670,098

Int. Cl.² A45D *1/00*

U.S. Cl. 132—9 **10 Claims**

1. Rinse bib construction adapted to be worn on the head of a person adjacent the hairline including

a. a body of lightweight, flexible, waterproof, sheetlike material having at least an upper edge and a pair of side edges, said body being adapted to extend downwardly along the neck and back of a patient;

b. a generally circular cut-out formed in the upper edge of the body adapted to receive a person's head therein;

c. a pair of flap means defining a portion of the headreceiving cut-out adapted to abut the sides of the head and extend outwardly therefrom;

d. attachment means mounted on the flap means for attaching the cape construction on the head;

e. flexible pocket means having a top opening formed integrally with the bottom end of the body for receiving liquid applied to the head;

f. fold means formed along the side edges of the pocket means and extending partially into the pocket means for maintaining said pocket means in partially open liquid-receiving position; and

g. a drain hose mounted on the bottom of the pocket means for removing liquid collected within said pocket means.

3,996,947

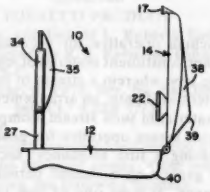
MAKE-UP KIT

Roman Szpur, and James M. Holahan, both of Dayton, Ohio, assignors to Fashion Optics, Inc., Dayton, Ohio

Filed Nov. 10, 1975, Ser. No. 630,523

Int. Cl.² A45D *40/00*

U.S. Cl. 132—79 G **9 Claims**



1. An appliance useful to wearers of corrective eyeglasses for applying make-up to the eyes, with the glasses removed comprising:

a case having a top and bottom section,

at least one prescription lens,

a mirror surface on the interior of said top section,

means supporting said lens in alternate position with respect to said bottom section,

said supporting means in one position with the case open holding said lens upright from said bottom section and in spaced relation to said mirror surface, defining a vertex distance with said mirror which substantially exceeds that of prescription eyeglasses,

said supporting means in another position with the case closed holding said lens stored generally parallel to said bottom section.

3,996,948

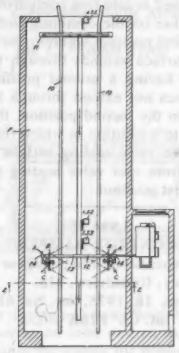
TRUCK WASH APPARATUS

Robert B. Wiley, 289 6th Ave. North, Tierra Verde, Fla. 33715

Filed Feb. 18, 1975, Ser. No. 550,207

Int. Cl.² B60S *3/04*; B08B *3/02*

U.S. Cl. 134—45 **6 Claims**



1. In a truck wash apparatus wherein the truck is moved through the truck wash apparatus, the combination comprising

a pair of supports mounted along the path of the truck such that the truck moves between the supports,

a rotating fluid applicator for dispensing fluid from spaced points along the length thereof,

and means for supporting said fluid applicator for rotation such that the applicator has a plane of rotation,

means independent of direct contact with said truck for successively indexing between three positions including a first position wherein the plane of rotation is at an angle facing the truck as the truck approaches the supports, a second position wherein the plane of rotation of said applicator is parallel to the path of the truck, and a third position wherein the plane of rotation is at an angle facing away from the truck as the truck moves away from the supports such that as the truck moves toward the supports, the rotating fluid applicators are positioned at said first position with the plane of rotation at an angle to the oncoming truck for directing liquid toward the front of the truck, as the truck continues to move through the system and between the supports, the rotating applicators are indexed to said second position wherein the plane of rotation thereof is generally parallel to the path of the truck for directing liquid toward the side of the truck, and as the truck finally moves away from the supports, the applicators are indexed to said third position such that the plane of rotation thereof is at an angle for directing fluid toward the rear of the truck, said last mentioned means comprising a post rotatably mounted about a generally vertical axis on said support, a plurality a brackets on said post, and each said bracket rotatably supporting a fluid applicator.

3,996,949

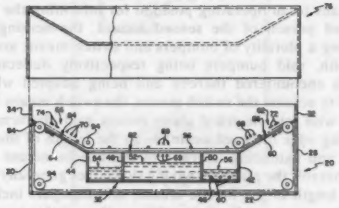
SOLVENT CLEANING SYSTEM

Kenneth G. Boynton, Milford, N.H., assignor to Hollis Engineering, Inc., Nashua, N.H.

Division of Ser. No. 505,317, Sept. 12, 1974, Pat. No. 3,968,013. This application Nov. 10, 1975, Ser. No. 630,527

Int. Cl.² B08B *3/02*

U.S. Cl. 134—72 **8 Claims**



1. In a system for cleaning work pieces with an organic solvent vapor, and having a tank for containing a liquid body of said solvent, a frame for supporting said tank, and means disposed in said tank for heating at least a portion of said solvent to boiling whereby to generate a quantity of solvent vapor above said tank, and means disposed above said tank for limiting the level of solvent vapor above said tank, the improvement comprising;

means for moving said work pieces in and out of contact with said solvent vapor and comprising;

an array of substantially parallel, spaced, elongated members each having a central portion depressed with respect to its end portions, said elongated members extending through and between said end portions, at least one intermediate section rigidly joining said elongate members so as to preserve the parallel relationship of said elongated members, means for supporting said array in a fixed position relative to said tank and frame so that said central portion of said array is located so as to be enveloped in said quantity of solvent vapor, and the end portions of said array are disposed to be above said level of solvent vapor,

means for directing a stream of liquid solvent onto said work adjacent said end portions of said array, and

means for moving said work pieces across the top surface of said array in the direction of elongation of said members.

3,996,950

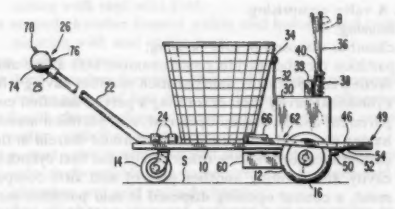
OBSTACLE DETECTION DEVICE FOR USE BY THE BLIND

Randall Mier, 447 Norway Ave., Trenton, N.J. 08629

Filed Apr. 30, 1975, Ser. No. 573,187

Int. Cl.² A45B *3/04*; A61H *3/06*

U.S. Cl. 135—66 **5 Claims**



1. An aid to be used by a visually impaired person for detecting hazards in the path of said person, comprising: a rollable assembly including a base in the form of a flat, horizontal

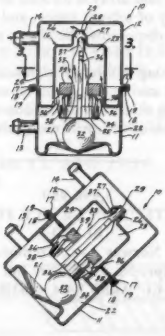
platform having front and rear wheels, said assembly further including an elongated handle means secured to the rear end of the platform and extending rearwardly upwardly therefrom, said handle means being adapted to be grasped by a user to propel the rollable assembly along said path; sensing means carried by said assembly adapted to detect hazards in the path of a visually impaired person, said sensing means being movable from a normal position to an operating position upon detection of a hazard in said path; and electrical alarm means for said rollable assembly actuated by movement of the sensing means to an operating position for informing the visually impaired person of the sensed hazard, the sensing means including a plurality of bumpers and switch means associated therewith, said bumpers being respectively deflectable by hazards encountered thereby and being adapted when deflected to actuate the switch means, the switch means being in circuit with said electrical alarm means, said platform having a leading edge disposed normally to the length of the handle means and extending laterally of the handle means at both sides thereof, the platform having side edges generally parallel to the length of the handle means, said bumpers including a front bumper centrally disposed upon the rollable assembly in front of and generally parallel to the leading edge thereof in position extending transversely of the assembly laterally beyond said side edges of the platform, said bumpers further including side bumpers projecting laterally outwardly from the respective side edges of the platform, the front and side bumpers being generally coplanar with the platform and being disposed in overlapping relation at the respective, opposite sides of the platform.

3,996,951

SAFETY ROLL OVER VALVE

Erwin W. Parr, and Timothy B. Brandt, both of Des Moines, Iowa, assignors to Parr Manufacturing Inc., Des Moines, Iowa

Filed Nov. 17, 1975, Ser. No. 632,223
Int. Cl.² F16K *17/36*
U.S. Cl. 137—43 **2 Claims**



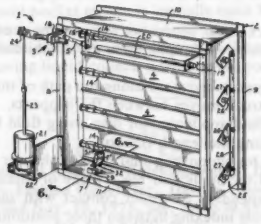
1. A valve comprising:
a housing;
a chamber disposed in said housing;
a partition member dividing said chamber into a first and a second compartment, said partition member having a first cylindrical cavity therein forming a part of said first compartment and having an open end, said partition member having a second cylindrical cavity formed therein in fluid communication with the other end of said first cylindrical cavity and forming another part of said first compartment, a central opening disposed in said partition member at one end of said second cylindrical cavity and having a valve seating surface therearound;
an inlet port connected to said housing and being in fluid communication with one of said compartments;
an outlet port connected to said housing and being in fluid communication with the other of said compartments;
a valve member disposed in said first compartment, said valve member having a valve head on one end thereof extending into and located at all times in said second cavity, the other end of said valve having a camming surface thereon, fin means connected to said valve body and extending radially from said valve member intermediate the ends thereof for maintaining the valve member aligned in said first cavity and allowing fluid flow therearound, the radially outermost portion of said fin means being substantially shorter than said valve member to allow the valve member to tip about the outermost portion of the fin means;
a conically shaped surface is disposed in said first compartment and having a central axis defining the center of the conically shaped surface, the axis of the conically shaped surface being substantially coincident with an axis defining the center of the central opening; and
a ball being disposed in said first compartment and abutting the valve member on the camming surface thereof, said ball having a first position wherein the axis of the conically shaped surface extends through the center of the ball, said ball having a second position whereby said conical axis does not extend through the center of the ball, whereby in the second position, the ball forces the valve member to a position in which the valve head is in contact with the valve seating surface, said valve head being spaced from said valve seating surface when the ball is in the first position.

3,996,952

CONTROL DAMPER

James R. Root, Independence, Mo., assignor to Ruskin Manufacturing Company, Grandview, Mo.

Filed Sept. 18, 1975, Ser. No. 614,593
Int. Cl.² F16K *17/38*
U.S. Cl. 137—77 **7 Claims**



1. A control damper for a fluid conduit, said control damper comprising:
a. a housing defining a control opening;
b. at least one vane mounted in said housing and having opposed side portions and movable between a fluid flow permitting position and a position closing the control opening;
c. resilient means mounted on said housing and connected to said vane for urging same into the position closing the control opening;
d. means mounted on said housing and connected to said vane for moving same between the flow permitting position and the position closing the control opening and having a fusible portion thereby allowing said resilient means to move said vane into the position closing said control opening in the event of temperature above the melting point of said fusible portion;
e. means mounted on said vane and said housing for retaining said vane in the position closing the control opening after melting of said fusible portion, said means for retaining said vane in said closing position after melting of said fusible portion including:

1. a stop member mounted on said housing adjacent said vane;
2. a fusible link having opposite ends;
3. a first holder member mounted on said vane and having one end of said fusible link connected thereto; and
4. a second holder member mounted on said vane and having the other end of said fusible link connected thereto, said second holder member being resilient and retained in a position to clear said stop member during movement of said vane and movable to a position in engagement with said stop member upon melting of said fusible link.

3,996,953

APPARATUS FOR DOSING A FLOWING FLUID

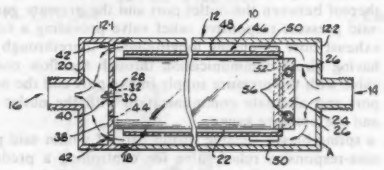
Edgar Peter Scragg, 60 Mulder St., Florida Park Extension 3., Florida, Transvaal Province, South Africa

Filed Aug. 18, 1975, Ser. No. 605,684

Claims priority, application South Africa, Aug. 19, 1974, 74/5307

Int. Cl.² G05D *11/00*

U.S. Cl. 137—101.11 15 Claims



1. Apparatus for dosing a flowing fluid, the apparatus comprising a casing having an inlet and an outlet for said fluid, securing means within the casing for preventing one end of a flexible twistable additive container from rotating, a rotatable element within the casing for receiving and holding fast in rotation therewith the other end of an additive container, a structure within the casing for producing a torque for rotating said element in one direction, and means for directing said flowing fluid against said structure so as to produce a torque for rotating said element with respect to said securing means.

3,996,954

AUTOMATIC PRESSURE REGULATOR

Francois Monnet, Nice, France, assignor to Cession a la Societe Europeenne de Distribution Electromecanique "S.E.D.E.M.", Marseille, France

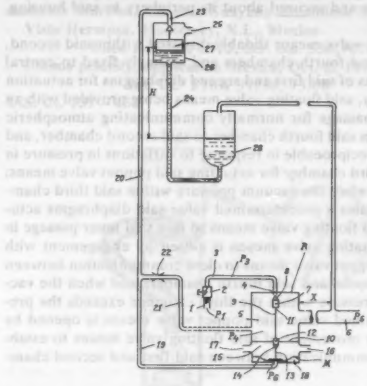
Filed Apr. 15, 1975, Ser. No. 568,374

Claims priority, application France, Apr. 17, 1974, 74.14319

Int. Cl.² F16K *31/365*

U.S. Cl. 137—116.3 3 Claims

1. Apparatus for regulating the pressure of a fluid in a conduit, comprising a source of said fluid under pressure, and between said source and said conduit a body subdivided into three chambers, the first of said chambers being separated from a second of said chambers by a fixed partition, and said second chamber being separated from a third of said chambers by a diaphragm, said first chamber communicating with said conduit and said source, said second chamber communicating with the ambient air, said third chamber communicating with a liquid manometer first portion and a source of pressurized fluid, a pilot valve actuated by said manometer to open and close said third chamber to the ambient air, a second portion of said manometer communicating with said conduit, a rod secured to said diaphragm, and two valves carried by said rod, one of said two valves closing the communication between said first mentioned source and said first chamber at the same time that the other of said two valves opens said fixed partition, said other valve closing said fixed partition at the same time that said one valve opens said first mentioned source to said first chamber.



3,996,955

VACUUM SUPPLY VALVE

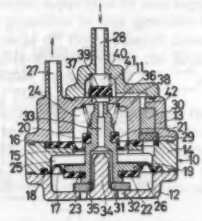
Yasuhiro Kawabata, Toyota, Japan, assignor to Aisin Seiki Kabushiki Kaisha, Toyota, Japan

Filed Oct. 29, 1974, Ser. No. 519,022

Claims priority, application Japan, Nov. 16, 1973, 48-129605

Int. Cl.² G05D *11/03*

U.S. Cl. 137—116.5 4 Claims



1. A vacuum supply valve interposed between a carburetor and a vacuum control apparatus for a distributor of a vehicle engine, comprising:

a housing provided with an inlet port connected to an advance port of the vehicle carburetor and an outlet port connected to the vacuum control apparatus for the vehicle distributor;

a first chamber formed within said housing and communicating with said inlet port;

a second chamber formed within said housing and communicating with said outlet port;

an orifice means;

a third chamber formed within said housing and communicating with said first chamber through said orifice means;

a fourth chamber formed within said housing and communicating with the atmosphere;

a poppet valve means disposed within said first chamber for selectively establishing communication between said first chamber and said second chamber;

a first diaphragm disposed between and responsive to the pressures within said second chamber and said third chamber and secured about its periphery to said housing;

a second diaphragm disposed between and responsive to the

pressures within said third chamber and said fourth chamber and having a larger effective area than said first diaphragm and secured about its periphery to said housing, and

a floating valve means slidably disposed within said second, third and fourth chambers and sealingly fixed to central portions of said first and second diaphragms for actuation thereby, said floating valve means being provided with an inner passage for normally communicating atmospheric air from said fourth chamber to said second chamber, and being reciprocable in response to variations in pressure in said third chamber for actuating said poppet valve means;

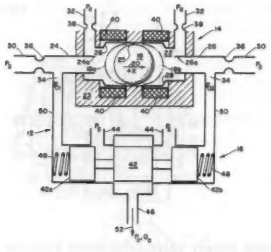
whereby when the vacuum pressure within said third chamber attains a predetermined value said diaphragms actuate said floating valve means so that said inner passage in said floating valve means is closed by engagement with said poppet valve means to close communication between said second and said fourth chambers and when the vacuum pressure within the third chamber exceeds the predetermined value said poppet valve means is opened by further movement of said floating valve means to establish communication between said first and second chambers.

3,996,956

ELECTRO-FLUID INTERFACE DEVICE

Charles K. Taft, Durham, N.H., assignor to University of New Hampshire, Durham, N.H.

Filed Nov. 10, 1975, Ser. No. 630,369
Int. Cl.² G05D *11/00*
U.S. Cl. 137—119 **15 Claims**



1. An interface device for converting an electrical signal into a fluid flow proportional to the signal comprising, in combination,

a housing having an internal chamber and associated fluid inlet, outlet and drain means, each in fluid communication with said chamber, that establish a fluid flow from said inlet means to said outlet and drain means,

a control member movable in said chamber generally in a first direction,

a pair of nozzles each having a first end in direct fluid communication with said chamber and aligned along said first direction on opposite sides of said control element to direct said fluid flow to oscillate said control element at a substantially steady frequency between said nozzles,

means for electromagnetically pulse width modulating said oscillation in response to said electrical signal to establish a fluid flow through said outlet means that is proportional to said signal, and

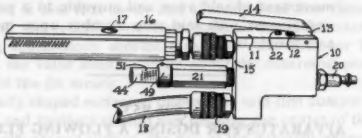
stops located in said chamber proximate each of said nozzles to prevent said control element from seating on the first ends of said nozzles.

3,996,957

INFLATOR VALVE WITH PRESSURE GAUGE AND SAFETY REGULATOR

Milton Goldish, and Stanley J. Majewski, both of Chicago, Ill., assignors to Milton Industries, Inc., Chicago, Ill.

Filed Sept. 12, 1975, Ser. No. 612,867
Int. Cl.² F16K *15/20*
U.S. Cl. 137—224 **3 Claims**



1. An inflator valve having a hand-operated flow control valve, wherein the improvement comprises

a. a housing for the flow control valve having a pressure supply intake port in one edge wall and a pressure gauge and outlet port in the opposite edge wall,

b. an elongated pressure-responsive relief valve carried by said housing and extending from said opposite edge wall thereof between the outlet port and the pressure gauge,

c. said pressure-responsive relief valve providing a center exhaust bore extending longitudinally therethrough and having direct communication through the flow control valve with the pressure supply intake port and the outlet port and alternate communication with the outlet port and the pressure gauge,

d. a spring-biased slidable piston carried within said pressure-responsive relief valve for controlling a predetermined amount of pressure flowing into the inflator valve housing from the pressure supply intake port and out the outlet port,

e. a gauge tube threadable into the center exhaust bore of said pressure-responsive relief valve so as to adjust the spring bias against said piston to regulate the amount of pressure within said housing required to slidably move said piston longitudinally within said center bore of said pressure relief valve to vent exhaust pressure therethrough into the atmosphere, and

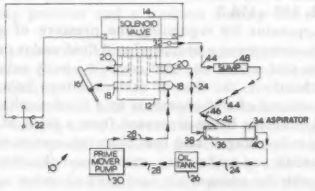
f. indicia on said gauge tube to visually indicate the pressure-responsive condition of the valve.

3,996,958

HYDRAULIC VALVE ASPIRATOR

Pierre A. Lajoie, Grand Falls, Canada, assignor to Lajoie Enterprises Ltd., Canada

Filed July 21, 1975, Ser. No. 597,902
Claims priority, application Canada, Apr. 4, 1975, 223827
Int. Cl.² F16K *51/00*
U.S. Cl. 137—312 **1 Claim**



1. In an hydraulic circuit including a solenoid valve having a pilot drain for fluid leakage, an apparatus for applying a negative pressure to said pilot drain comprising an aspirator adapted to be connected in said hydraulic circuit with said valve and intermediate the valve and an oil tank, said aspirator having a main, through bore for the passage of oil there-

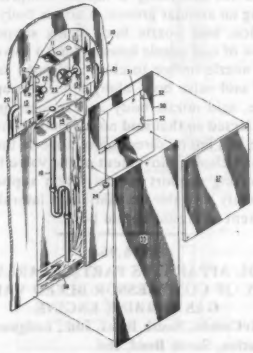
through under pressure from a cylinder exhaust to the oil tank, and a branch bore angularly disposed from and communicating with the main, through bore and being directed to the downstream direction thereof; and wherein the through bore has an upstream inlet and a downstream outlet, said upstream inlet end being of frusto-conical configuration towards the downstream end and terminating intermediate the ends of the aspirator at the wider, cylindrical walls of the main, through bore; the branch bore communicating with the through bore downstream of the frusto-conical portion.

3,996,959

WASHER-CONNECTOR SERVICE BOX

Juanita W. Caruth, 3519 W. 78th, Prairie Village, Kans. 66208

Filed May 21, 1973, Ser. No. 362,223
Int. Cl.² F16L 5/00
U.S. Cl. 137—360 3 Claims



1. In a water service box for installation in a wall structure and for connection to taps and drains mounted at various heights in said wall structure, the combination which comprises:

a. a rectangular box having top and side walls, the dimension thereof being such as adapting the same to be attached to said wall structure in a recessed position at various heights, said box having ports capable of receiving a water pipe therethrough having a tap thereon,

b. a horizontal partition attached to and extending between said sidewalls and being recessed downwardly from each wall of said box and having a drain outlet centrally thereof and an upturned flange formed along the front edge of said horizontal partition,

c. a face plate removably connected to said box having a port therethrough for passage of hoses to connect to said water tap and for passage therethrough of a line leading to said drain, said plate having a lower portion extending to the lower edge of said box, and

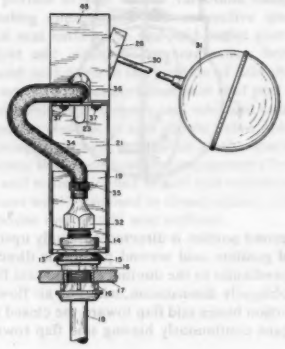
(d) an extension access plate removably connected to said face plate, said access plate removably secured to said wall structure to cover an opening providing service access to the drain and covering varying portions of said face plate depending upon the height said box is attached in said wall structure.

3,996,960

LIQUID LEVEL CONTROLLING VALVE

Federico Martinez-Lozano, Guayana Holandesa No. 350 Col. Vista Hermosa, Monterrey, N.L., Mexico

Filed Feb. 27, 1975, Ser. No. 553,767
Claims priority, application Mexico, Oct. 2, 1974, 154122
Int. Cl.² F16K 31/18, 33/00
U.S. Cl. 137—451 3 Claims



1. A liquid level controlling valve for stationary tanks, such as toilets, humidifiers and the like, comprising:

a flexible liquid inlet pipe;

a flexible hose having one end coupled in liquid tight manner to one end of said flexible liquid inlet pipe;

a supporting structure supporting said flexible hose and provided with a base portion for mounting said supporting structure within a tank;

a valve closure member supported by said supporting structure so as to be pivotable in one direction to clamp the flexible hose to close off flow of liquid therethrough and in the opposite direction to release the flexible hose and permit flow of liquid therethrough;

a float;

a substantially rigid member coupling said float mechanically to said valve closure member so that on raising of said float the valve closure member pivots in said one direction and on lowering of said float the valve closure member is permitted to pivot in said opposite direction; and

means connecting said supporting structure to said base portion in such manner as to enable the height of the supporting structure with respect to the base portion to be varied

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3,996,961

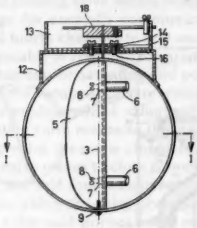
FLOW REGULATOR FOR AIR DUCTING

Emil Siegwart, Michael-Blatter-Strasse 6, D-6603 Sulzbach-Neuweiler, Germany

Filed June 26, 1974, Ser. No. 483,423
Claims priority, application Germany, July 3, 1973, 2333694
Int. Cl.² F16K 15/02, 31.12
U.S. Cl. 137—517 15 Claims

1. In an air ducting section, a flow regulator comprising a flap for varying the free ducting cross-section, a shaft mounted transversely in the ducting section spaced from the central axis thereof by 1 to 4% of the ducting diameter, said flap being mounted on said shaft for rotation about the shaft axis to vary the free ducting cross-section, said flap comprising first and second portions obtusely angled relative to each other along a straight axial bend line closely adjacent and parallel to said shaft such that the two portions stand at an angle of 135° to 160° in relation to one another, said ducting section having an

air inlet end and an air outlet end defining the direction of air flow therethrough, means defining an open position and a closed position for said flap, said first and second portions being angled relative to each other such that in the open position of said flap the first portion is directed downstream from said shaft generally parallel to the direction of air flow



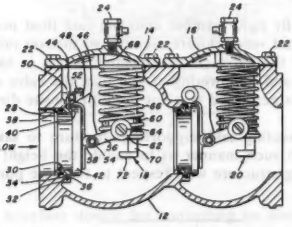
and the second portion is directed obliquely upstream, and in the closed position said second portion is directed substantially perpendicular to the ducting axis and said first portion is directed obliquely downstream, whereby air flow against said second portion biases said flap toward the closed position, and spring means continuously biasing said flap toward the open position.

3,996,962

BACKFLOW PREVENTER AND RELIEF VALVE ASSEMBLY

Ray Sutherland, Hopwood, Pa., assignor to Rockwell International Corporation, Pittsburgh, Pa.

Filed Mar. 19, 1976, Ser. No. 668,627
Int. Cl.² F16K *15/03*
U.S. Cl. 137—527.4 **6 Claims**



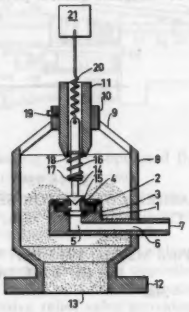
1. A check valve assembly adapted to be mounted to accommodate horizontal fluid flow, having a housing and a valve assembly in said housing, comprising: a valve seat in said housing defining a fluid flow passageway, a hinge member mounted on said housing for pivotal movement about an axis normal to the direction of fluid flow, a valve cover member carried by said hinge member adapted to cooperate with said valve seat to control fluid flow through said valve, link means pivotally attached at one end to said hinge member and projecting rearwardly from said cover member, the other end of said link member being pivotally mounted on a roller assembly which bears on a track, said roller assembly being spring biased to the valve closed position, said roller assembly being constrained to move in a vertical path by said track which is fixed to said housing, said link means making an acute angle with the horizontal when said valve assembly is in the closed position, whereby a large portion of the force tending to open said check valve is exerted against said track.

3,996,963

ATOMIZING NOZZLE WITH LATERALLY MOVABLE SEAT

Knut Ludvig Winquist, Elmira, N.Y., assignor to Clean Air Company, Inc., "CASCA", Panama

Filed Nov. 12, 1974, Ser. No. 523,075
Claims priority, application Sweden, Oct. 9, 1974, 7412673
Int. Cl.² F16K *15/02*
U.S. Cl. 137—529 **8 Claims**



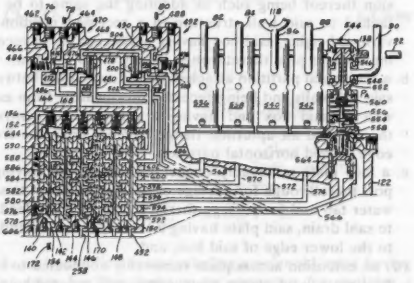
1. A nozzle for atomizing a liquid, comprising a nozzle housing having an annular groove, a nozzle body formed with a nozzle orifice, said nozzle body being supported in said annular groove of said nozzle housing, and a valve body coacting with said nozzle orifice to close and open said orifice by movement of said valve body along a line through the center of said orifice, said nozzle body and annular groove dimensions being selected so that said nozzle body is freely movable in said groove in a lateral direction relative to the direction of the opening and closing movement of the valve body and said valve body having support means which support the valve body to be freely movable in said same lateral direction to permit alignment with said nozzle body.

3,996,964

CONTROL APPARATUS PARTICULARLY FOR A PLURALITY OF COMPRESSOR BLEED VALVES OF A GAS TURBINE ENGINE

Howard L. McCombs, South Bend, Ind., assignor to The Bendix Corporation, South Bend, Ind.

Division of Ser. No. 289,404, Sept. 15, 1972, Pat. No. 3,848,636. This application July 22, 1974, Ser. No. 490,623
Disclosure was also published under second Trial Voluntary Protest Program on Mar. 2, 1976
Int. Cl.² F16K *11/20*
U.S. Cl. 137—608 **8 Claims**



1. Fluid control apparatus comprising:
a first source of pressurized fluid;
a second source of pressurized fluid;
a plurality of fluid pressure responsive means;

first and second flow passage means in parallel flow relationship communicating said first source of pressurized fluid with each of said fluid pressure responsive means;

first control valve means operatively connected to said first and second flow passage means and having a first position wherein said first passage means is blocked and a second position wherein said second passage means is blocked;

a plurality of second control valve means operatively connected to said first and second flow passage means in series flow relationship and provided with port means for venting one of said first and second flow passage means to said second source of pressurized fluid depending upon the relative positions of said plurality of second valve means; and

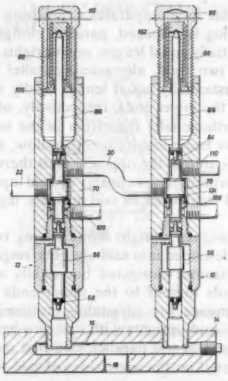
means responsive to a control input signal operatively connected to each of said first and second valve means for actuating the same from a first position to a second position.

3,996,965

PILOT VALVE MECHANISM FOR HIGH OR LOW PRESSURE CUTOFF CONTROL

Clifford M. Peters, 1407 Pentecost Road, Kilgore, Tex. 75662

Continuation of Ser. No. 410,182, Oct. 26, 1973, abandoned.
This application Mar. 21, 1975, Ser. No. 560,598
Int. Cl.² F16K *11/02*
U.S. Cl. 137—625.66 **12 Claims**



1. A quick bleeding pressure responsive pilot valve mechanism for rapidly bleeding a pilot controlled control pressure system responsive to sensing of an unsafe condition in a pressurized primary system, said pilot valve mechanism comprising:

a valve body having a longitudinal chamber defined therein, said longitudinal chamber being disposed in direct fluid communication with said pressurized primary system, said valve body having a valve chamber therein and defining opposed internal seat surfaces within said valve chamber;

piston means being disposed within said longitudinal chamber and being movable responsive to variations in pressure within said pressurized primary system, said piston means having first shuttle valve support means formed thereon;

a tension spring system being retained within said body and opposing movement of said piston means and yielding in proportion to the pressure of said pressurized system acting upon said piston means and allowing pressure responsive proportional movement of said piston means, said tension spring system having second shuttle valve support means;

inlet, outlet and vent ports formed in said valve body and communicating with said valve chamber;

a shuttle valve being disposed for free, pressure responsive movement within said valve chamber, said shuttle valve having opposed ends supported between said first and second shuttle valve support means, being linearly movable in one direction by said piston means and being linearly movable in the opposite direction by said spring system, said shuttle valve having an enlarged portion disposed between said internal seat surfaces; and

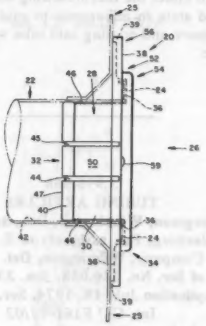
seal means being supported at each extremity of said enlarged portion of said shuttle valve and being movable into sealing engagement with respective ones of said opposed seat surfaces to seal said outlet port from said inlet port and establish communication between said outlet and vent ports in the position of said shuttle valve and to seal said outlet port from said vent port and establish communication between said inlet and outlet ports in the opposite position of said shuttle valve, said seat surfaces being so spaced, in relation to the spacing of said seal means, that upon touching engagement between one of said seal means and one of said seat surfaces, the other seal means will be disposed in closely spaced relation with the opposite one of said seat surfaces.

3,996,966

DISPOSABLE END CLOSURE

William E. Princell, 10803 Wildwood Drive, Indianapolis, Ind. 46256

Filed Apr. 8, 1976, Ser. No. 674,859
Int. Cl.² F16L *55/10*
U.S. Cl. 138—89 **10 Claims**



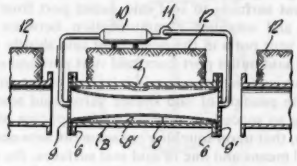
1. A disposable end closure for insertion into a pipe for closing the axially facing end of the pipe, the pipe having a lip at its axially outer, open end and a first cross section, the closure comprising an axially elongated portion for insertion into the pipe end, the elongated portion having a sidewall and a closed axially inner end, a first flange for engaging the lip of the pipe end, the first flange extending radially outwardly of the elongated portion axis from the axially outer end of the elongated portion to prevent axial insertion of the elongated portion into the pipe end beyond the first flange, a portion for engaging the inner wall of the pipe, the wall-engaging portion being located axially inwardly of the first flange on the elongated portion, and at least one tear line for allowing the closure to be torn so that the closure may be removed from the pipe end, the tear line extending across a portion of the first flange and across the wall-engaging portion a sufficient distance to allow the wall-engaging portion to be collapsed slightly for easy removal of the closure from the pipe end.

3,996,967

REINFORCED LINING FOR TUBES

Takezo Takada, Hikone, Japan, assignor to Takata Kojyo Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 400,442, Sept. 24, 1973, abandoned.
This application Feb. 18, 1975, Ser. No. 550,807
Claims priority, application Japan, Oct. 18, 1972, 47-103544
Int. Cl.² F16L 55/18; B32B 35/00
U.S. Cl. 138—97 6 Claims



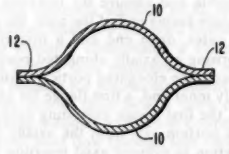
1. The method of lining a pipe with a heat rigidifiable and settable thermosetting, synthetic organic polymeric resin composition tube reinforced peripherally with peripherally extending synthetic polymeric fibers of high non-recoverable elongation and longitudinally with fibers of low elongation in an unexpanded state comprising inserting in said pipe a tube with the property characteristics set forth above having an outside diameter less than the inside diameter of said pipe, radially expanding and peripherally extending said tube while in a soft flexible condition into tight engagement with the inside face of said pipe by inflating and filling said tube with pressurized and heated fluid, said peripheral extension of said tube being of an amount sufficient to non-recoverably elongate said peripheral fibers, and heating said inflated and expanded tube to effect the thermosetting and hardening of said tube to a rigid state in adherence to said pipe and relieving said fluid pressure and cooling said tube while in engagement with said pipe.

3,996,968

TUBING ARTICLES

Richard C. Bergman, Wilmington, Del., and Kenneth R. Williams, Landenberg, Pa., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation of Ser. No. 326,058, Jan. 23, 1973, abandoned.
This application July 15, 1974, Ser. No. 488,827
Int. Cl.² F16L 11/02
U.S. Cl. 138—118 4 Claims



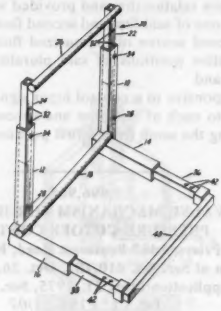
1. As a new article of manufacture, a flexible fluid permeable tubing, said tubing having walls formed from two, like, superimposed, elongated members the lateral edges of which terminate in flat sealed projections, each of said elongated members being formed throughout its length of plexifilamentary polyolefin material having a porosity ϵ between 0.5 and 0.7, a contact angle greater than 85°, and a Gurley-Hill porosity of 4 to 70 seconds per 100 cubic centimeters.

3,996,969

ADJUSTABLE LOOM

George W. McCullough; Henrietta Tragitt McCullough, both of Fort Wayne, and Timothy E. Doyle, New Haven, all of Ind., assignors to George W. McCullough and Henrietta Tragitt McCullough, both of Fort Wayne, Ind.

Filed Aug. 15, 1975, Ser. No. 604,914
Int. Cl.² D03D 29/00
U.S. Cl. 139—29 3 Claims



1. An adjustable loom apparatus comprising a first rectangular frame having two spaced, parallel, elongated, rigid uprights of substantially equal length, said uprights being longitudinally hollow; two rigid, elongated, parallel extending leg members of substantially equal length rigidly secured at the ends thereof to the lower ends, respectively, of said uprights which extend orthogonally therefrom in the same direction, said leg members being longitudinally hollow; a first horizontal bar rigidly secured at the opposite ends thereof to one side of the lower portions, respectively, of said uprights thereby providing a rigid framework of said uprights, leg members and bar;

a second rectangular upright frame having two rigid frame elements telescoped into said uprights, respectively, and a second horizontal elongated bar rigidly secured at the opposite ends thereof to the upper ends of said frame elements; means for adjustably positioning the frame elements in said uprights with said two bars being maintained horizontal and parallel, said first and second bars being mounted on the same sides of said frame elements and uprights,

said means including two pins received by companion holes in the upper portions of said uprights and said frame elements, there being a plurality of holes in said frame elements spaced longitudinally thereof whereby said bars may be selectively spaced apart predetermined distances,

a rigid stabilizing frame having two parallel extending arms joined at one end thereof by a stabilizing bar, said arms being telescopically received by said leg members, thereby providing an adjustable supporting base for said first and second frames.

3,996,970

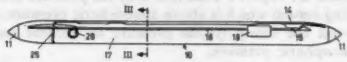
ELASTIC SHUTTLE FOR LOOMS

Franz Meier, Ruti, Switzerland, assignor to Ruti Machinery Works Ltd., Ruti, Switzerland

Filed June 30, 1975, Ser. No. 591,864
Claims priority, application Switzerland, July 19, 1974, 9963/74
Int. Cl.² D03J 5/00, 5/02, 5/08
U.S. Cl. 139—196.1 5 Claims

1. Elastic shuttle for looms with automatic changing of the filling thread bobbins, said elastic shuttle having an elongated shuttle body which has an opening for the reception of a filling thread bobbin, said opening being disposed between a front

and a rear longitudinal side of the shuttle body, a longitudinally extending thread groove and a recess for a thread cutter provided on said front longitudinal side of the shuttle body, clamping jaws on the inner sides and at one end of said opening to hold the bobbin body of a filling thread bobbin fast in



said opening, which makes possible the spreading apart of the clamping jaws upon the change of the bobbin, the parting slot extending outward to the front longitudinal side of the shuttle body which has the thread groove and the recess for the thread cutter.

3,996,971

NEEDLE LOOM AND METHOD FOR PRODUCING KNITTED ARTICLES

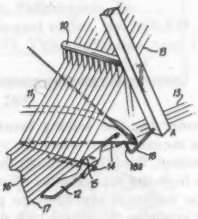
John Dalton Griffith, Sunderland, and Robin Bidgood, Nuneaton, both of England, assignors to Bonas Machine Company Limited, Sunderland, England

Filed Sept. 30, 1975, Ser. No. 618,045

Claims priority, application United Kingdom, Oct. 3, 1974, 42867/74

Int. Cl.² D03D *47/42, 5/00*

U.S. Cl. 139—431 **5 Claims**



1. A needle loom including heald frames and a means for producing a warp shed, a weft inserter needle for inserting successive loops of weft into the shed from one edge thereof and a knitting needle at the other edge for securing successive loops of weft against removal from the fabric, a beat-up means for beating up inserted weft loops, and a movable weft loop engaging means adjacent to and movable in synchronism with the knitting needle and adapted to engage at least some of the inserted weft loops in a predetermined sequence thereby to produce decorative loops of weft extending beyond the knitted edge of the fabric.

3,996,972

ARRANGEMENT FOR ACTUATING LAMINAS ON A WAVE-TYPE LOOM

Hans Zollinger, Tann-Ruti, Switzerland, assignor to Ruti Machinery Works Ltd., Ruti, Switzerland

Filed June 30, 1975, Ser. No. 591,865

Claims priority, application Switzerland, July 6, 1974, 9379/74

Int. Cl.² D03D *47/26*

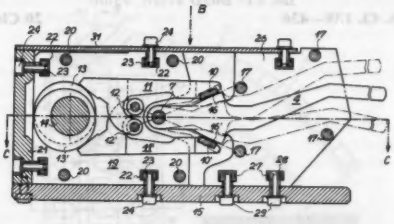
U.S. Cl. 139—436 **14 Claims**

1. Arrangement for the actuating of laminas on an undulating-shed-type weaving machine, said laminas:

a. acting as filling-thread beat-up members and in operation carrying out in their entirety an undulating movement in the direction advancing over the width of the machine;

b. being arranged along a pivot axis over the width of the machine and being adapted to be pivoted about said axis by means of drive cams;

c. being formed as single-armed levers having a contact surface at their top and at their bottom edges as referred to their direction of swing about their axis of pivot and being held at said contact surfaces by a separate coupling body of flexible material in each case, each of said coupling bodies extending over the entire width of the machine; and



d. being actuated by drive means arranged close together over the width of the machine and being coupled with said drive cams, and drive means acting on the coupling bodies and having at the part acting on the coupling bodies a width being several times the thickness of a lamina.

3,996,973

DRIVE SHAFT FOR SWINGING OF REED TEETH

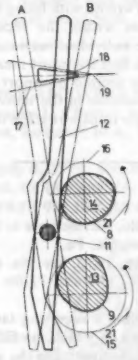
Edgar Strauss, and Xaver Gsell, both of Ruti, Switzerland, assignors to Ruti Machinery Works Ltd., Ruti, Switzerland

Filed July 7, 1975, Ser. No. 593,483

Claims priority, application Switzerland, Aug. 29, 1974, 11769/74

Int. Cl.² D03D *47/26*

U.S. Cl. 139—436 **11 Claims**



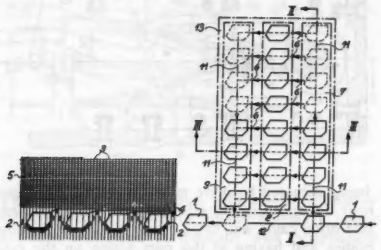
1. Shaft arrangement on a traveling wave loom for the pivoting of the reed teeth during the operation of the loom in which reed teeth are formed of elongated thin blades, the wide sides of which are perpendicular to a helically profiled contracting surface of a rotating screw shaft of said shaft arrangement and one edge of each abuts against the surface of said shaft, at least one lubricating groove extending the length of said shaft for supplying lubricant between the contacting surfaces of said surface and said one edge abutting against said surface and a lubricant holder means which is impregnated with a lubricant being contained in said groove, said groove following the profile of said shaft so as to always be forward of the point of maximum pressure between said surface and said one edge.

3,996,974

DEVICE FOR WINDING BOBBINS WITH FILLING THREADS

Walter Muller, Tann-Ruti, Switzerland, assignor to Ruti Machinery Works Ltd., Ruti, Switzerland

Filed Aug. 5, 1975, Ser. No. 602,067
Claims priority, application Switzerland, Aug. 16, 1974, 11212/74
Int. Cl.² D03D 47/26, 45/00
U.S. Cl. 139—436 20 Claims



1. Device for winding bobbins with filling threads which can be introduced together with a weaving shuttle into the shed of a loom, said device having a shuttle receiving station, a bobbin winding station for supplying weft thread to the shuttles, and a shuttle delivery station, said stations having several sections, with a first transport means for the stepwise transporting of the shuttles from one station into the following station and having separate rotating winders for withdrawing filling threads from a supply bobbin, the winders associated in fixed position individually with each section of the winding station, characterized by the fact that each station has the same number of sections and that a second transport means is provided for the stepwise filling of the receiving station with empty shuttles and the stepwise emptying of the delivery station of shuttles having bobbins wound with filling thread thereon, said second transport means within the receiving and delivery stations connecting the individual sections to each other and so cooperating with the first transport means that the number of transport steps of the second transport means corresponding to the number of sections in the individual stations takes place between every two transport steps of the first transport means.

3,996,975

PRESSURE RELIEF SYSTEM

William B. Hansel, Media, Pa., assignor to Sun Oil Company of Pennsylvania, Philadelphia, Pa.

Filed Oct. 16, 1975, Ser. No. 623,208
Int. Cl.² B65B 31/06
U.S. Cl. 141—45 15 Claims

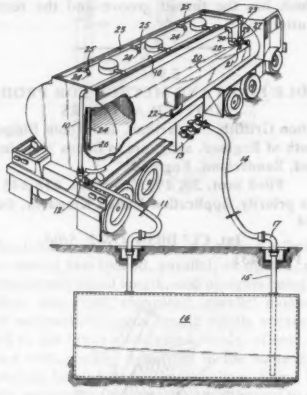
1. In a system for filling a receiving tank with a vaporous liquid from a source tank in which the filling system includes a dispensing line connected between the source tank and the receiving tank for directing the liquid to flow from the source tank to the receiving tank, and a vapor recovery system having a vapor recovery line connected between the receiving tank and the source tank for directing the vapors displaced from the receiving tank during the filling process to the source tank, and in which a pressure different than atmospheric pressure can develop in the filling system during the filling process due to the different ambient temperatures in the tanks as well as other conditions in the filling system, thereby possibly causing additional vapors from the filling system to be forced into the atmosphere when the connections to the tanks are uncoupled at the end of the filling operation in the event the pressure in the filling system is above atmospheric pressure;

an improvement for equalizing the pressure in the filling system at the end, or nearly at the end of the filling process, so that when the connections to the tanks are uncoupled, the amount of vapors forced into the atmosphere by the pressure in the filling system above atmospheric pressure is minimized, said improvement comprising:

a. a vapor collection means having an inlet and designed to collect the vapors forced into it by the pressure inside the filling system which is above atmospheric pressure, and to permit the filling system pressure to become equal to atmospheric pressure;

b. means for providing fluid communication between the inlet of the vapor collection means and the vapors in the filling system;

c. valving means; and



d. means for connecting the valving means to the fluid communication means so that when the valving means is in its closed position, fluid flow through the fluid communication means from the vapors in the filling system to the vapor collection means is prevented to permit efficient recovery of the vapors in the source tank during the filling process, and so that when the valving means is in its open position, fluid flow through the fluid communication means is permitted to allow the pressure in the filling system to become equal to atmospheric pressure, as well as to enable the vapor collection means to collect vapors, in the event the pressure in the filling system is above atmospheric pressure, to prevent pollution of the atmosphere by the vapors when the lines connecting the tanks are disconnected.

3,996,976

CHAMBER MANIFOLD FOR A HYDROCARBON VAPOR RECOVERY SYSTEM

William B. Hansel, Media, Pa., assignor to Sun Oil Company of Pennsylvania, Philadelphia, Pa.

Filed Oct. 16, 1975, Ser. No. 622,933
Int. Cl.² B65B 3/04
U.S. Cl. 141—285 5 Claims

1. In a hydrocarbon storage facility having a plurality of individual tanks, each tank having a vent line, and including a manifold system for the vent lines of each tank which is designed to permit easy access to the elements of the manifold, said manifold system comprising:

a. a container having a bottom and a sidewall;

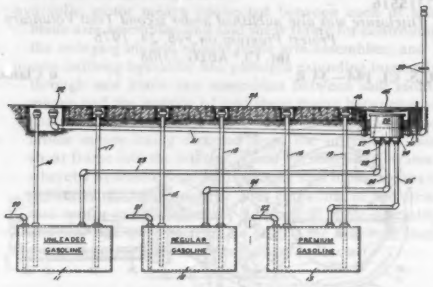
b. a plurality of valve housings mounted in the bottom of the container;

c. means for connecting each vent line from the tanks to the lower end of its respective valve housing;

d. liquid level sensitive valving means having a closed position when the liquid level reaches the valving means and an open position at all other times;

e. means for mounting each valving means in its respective valve housing so that it may be removed through the top of the valve housing;

f. a first coupling on the sidewall of the container for connection to a manifold vent line extending to a point above the ground level; and



g. a removable cover, secured to the top of the container in a sealed manner to provide a sealed enclosure as well as to permit access to the valving means for maintenance through the inside of the manifold.

3,996,977

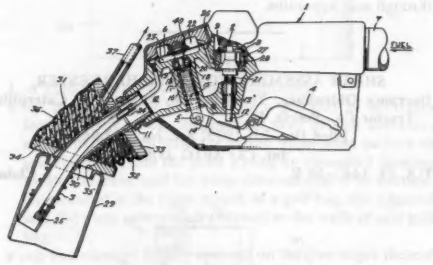
AUTOMATIC DISPENSING NOZZLE ADAPTED FOR VAPOR RECOVERY

William B. Hansel, Media, Pa., assignor to Sun Oil Company of Pennsylvania, Philadelphia, Pa.

Continuation-in-part of Ser. No. 468,841, May 10, 1974, Pat. No. 3,946,773. This application Aug. 11, 1975, Ser. No. 603,824

Int. Cl.² B65B *3/18*

U.S. Cl. 141—285 **3 Claims**



1. A liquid dispensing nozzle adapted for recovery of gasoline vapors displaced from a fuel tank being filled by the nozzle and comprising:

a. a discharge spout for insertion into a fillpipe for a motor vehicle fuel tank;

b. a vapor recovery boot surrounding the discharge spout and providing a passage for gasoline vapors displaced from a fuel tank, said boot being formed of a flat piece of flexible material wrapped around the discharge spout in a substantially cylindrical shape to provide a smooth, flat interior which will not trap condensed vapors or gasoline backed up into the boot, and a reticulated material filling the space between said discharge spout and said substantially cylindrically shaped flexible material and being secured to said substantially cylindrically shaped flexible material to prevent the flexible material from ballooning as a result of a build up of pressure of the displaced vapors, said reticulated material having a multiplicity of interconnected passages to allow the passage therethrough of displaced gasoline vapors.

3,996,978

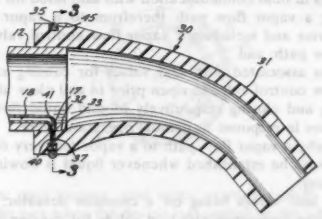
FUEL NOZZLE ADAPTOR

Michael G. Rapaelian, 3831 Wisteria St., Seal Beach, Calif. 90740

Filed Jan. 7, 1976, Ser. No. 647,057

Int. Cl.² B65B *3/18*

U.S. Cl. 141—285 **5 Claims**



1. In a fuel nozzle assembly comprising a handle for manual control over fuel flow and a nozzle for insertion into the fill pipe of an automobile, said nozzle including an overflow detection port proximate the free end thereof, the improvement comprising:

a tubular adaptor including an interior cavity on one end thereof adapted to receive the free end of said nozzle;

a peripheral groove formed on the exterior of said adaptor in radial alignment with said overflow detection port when said nozzle is received in said cavity;

a radial bore formed in said adaptor communicating between the bottom surface of said groove and said interior cavity;

a hollow pin conformed for telescopic insertion of said radial bore, said pin including an enlarged exterior end cap to limit the inward progression thereof and a rounded interior end separated from said end cap by a dimension greater than the length of said radial bore; and

a circular spring clip conformed for receipt in said peripheral groove for abutting said end cap and urging said hollow pin into said radial bore.

3,996,979

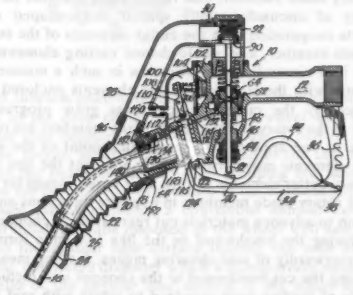
VAPOR RECOVERY NOZZLE

Robert H. Barr; Douglas L. Cheever, and Thomas A. Lyons, all of Dubuque, Iowa, assignors to A. Y. McDonald Mfg. Co., Dubuque, Iowa

Filed July 8, 1974, Ser. No. 486,640

Int. Cl.² B65B *3/18, 31/06*

U.S. Cl. 141—302 **8 Claims**



1. In a vapor recovery nozzle for use in filling tanks with vapor forming liquid products or the like, the combination, comprising:

a spout adapted to be introduced into the inlet of a tank to be filled;

a vapor collection hood disposed about said spout and adapted to engage substantially the entire periphery of a tank inlet when said spout is introduced therein;

a manually operable liquid flow control valve in fluid communication with said spout and adapted to control the flow of liquid from a source to said spout;

means in fluid communication with said hood for establishing a vapor flow path therefrom to a vapor recovery device and including a vapor flow control valve in said flow path; and

means associated with said valves for causing said vapor flow control valve to open prior to and close after opening and closing respectively of said liquid flow control valve in response to manual operation there,

whereby a vapor flow path to a vapor recovery device will always be established whenever liquid is flowing to said spout;

both said valves being on a common actuator; and said means associated with said valves for causing said vapor flow control valve to open prior to and close after opening and closing respectively and said liquid flow control valve including a lost motion connection between said common actuator and said liquid flow control valve.

3,996,980

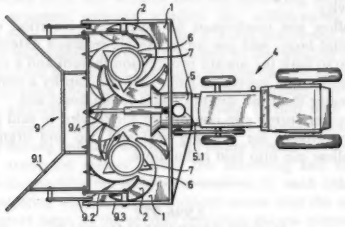
CLEARING MACHINE FOR BRUSHWOOD

Kyösti Pallari, 95385 Tervola, Finland

Filed Dec. 9, 1974, Ser. No. 531,044

Int. Cl.² A01G *23/08*; A01D *49/00*

U.S. Cl. 144—34 E **4 Claims**



1. Machine for clearing brushwood or the like comprising a frame, at least one pair of cutting units mounted on said frame, each of said cutting units comprising a stationary blade member having a plurality of circumferentially spaced cutter elements of generally triangular configuration and a rotary blade member cooperating with the cutter elements of the stationary blade member, said rotary blade member having a plurality of circumferentially spaced sickle-shaped cutter elements cooperating with the cutter elements of the stationary blade member, said sickle-shaped cutting elements projecting in a circumferential direction in such a manner that they form with the stationary blade elements enclosed areas restricted by the cutters which areas grow progressively smaller as the rotary and stationary blade members are rotated relative to one another and the cutting point of the sickle-shaped elements moves from points adjacent the tips of the stationary cutter elements toward their bases, means for rotating said rotary blade members in opposite directions and in a direction to advance materials cut rearwardly, a chopper unit for reducing the brushwood or the like to a chip form, disposed rearwardly of said shearing means, feeding means for advancing the cut brushwood to the chopper unit including a plurality of feeding reels mounted to rotate with said rotary blade elements in mutually opposite directions and pushing means engageable with the brushwood or the like forwardly of the blades and disposed at a predetermined height above the blades.

3,996,981

TREE FELLING APPARATUS

Lars Öjvind Bruun, Filipstad, Sweden, assignor to Bruun System AB, Filipstad, Sweden

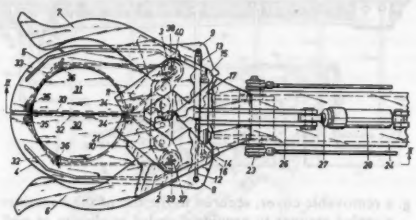
Filed Nov. 7, 1974, Ser. No. 521,793

Claims priority, application Sweden, Nov. 15, 1973, 7315516

Disclosure was also published under second Trial Voluntary Protest Program on Feb. 24, 1976

Int. Cl.² A01G *23/08*

U.S. Cl. 144—34 R **6 Claims**



1. An improved tree felling apparatus comprising two saw supports on a supporting member and arranged for swinging motion towards and away from one another, one guide bar on each saw support, a continuous saw chain supported on each guide bar so as to run around it in the horizontal plane of said bar, and at least one pair of gripping arms pivotally mounted in the apparatus (at a higher level) and adapted to grip a tree trunk, said two saw chains arranged to be driven in synchrony, while said saw supports approach one another, to cut said tree trunk, the improvement comprising single means incorporated in said apparatus to mechanically control the movement of each of said saw supports as well as those of said gripping arms relative to an imaginary vertical longitudinal medium plane through said apparatus.

3,996,982

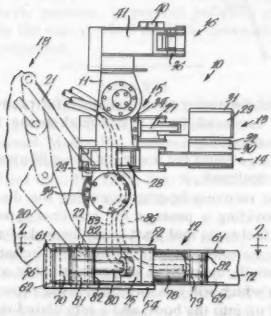
SHEAR ASSEMBLY FOR TREE HARVESTER

Dorrance Oldenburg, Yorkville, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Dec. 22, 1975, Ser. No. 642,963

Int. Cl.² A01G *23/08*

U.S. Cl. 144—34 E **6 Claims**



1. A shear assembly for a tree harvesting machine comprising:

a tubular harvester head frame; ,

a shear support frame attached to said harvester head frame, said shear frame having upper and lower spaced plates;

a pair of blade arm assemblies, each of said blade arm

assemblies being pivotally connected to said shear frame between said shear frame plates and carrying a blade extending from said shear frame, said blade arm assemblies being in spaced relation for swinging motion between an open position for receiving a tree and a closed position for severing a tree;

hydraulic motor means connected between each of said blade arm assemblies and said shear frame for controlling the swinging motion of said blade arm assemblies; and

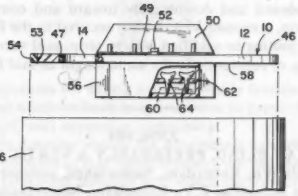
means defining hydraulic line passages extending internally through said blade arm assemblies between said motor means and the interior of said shear frame between said spaced plates, hydraulic lines communicating with said motor means being directed from the interior of said shear frame into the interior of said harvester head frame, whereby hydraulic fluid for operating said motor means is delivered through hydraulic lines extending to and from said motor means internally within said shear assembly and said harvester head frame so that the hydraulic lines are at least partially surrounded and protected.

3,996,983

CLUB HOLDER FOR GOLF BAGS

George J. Isnardi, San Jose, Calif., assignor to Lawrence Peska Associates, Inc., New York, N.Y., a part interest

Filed May 5, 1976, Ser. No. 683,636
Int. Cl.² A63B *55/00*
U.S. Cl. 150—1.5 R **9 Claims**



1. A club holder for golf bags comprising:

a flat plate, said flat plate having a plurality of apertures located therein, the longitudinal axes of said apertures substantially perpendicular to the uppermost surface of said flat plate, said flat plate having an elongated opening located therein, said flat plate dimensioned to be frictionally secured in the open mouth of a golf bag, the edges of said flat plate substantially normal to the walls of said golf bag;

a cup-like element fixedly secured on the free edges thereof to the lowermost surface of said flat plate below said elongated opening forming a storage area; and

a cover hingedly secured to said plate adjacent said elongated opening, said cover for selectively covering said opening.

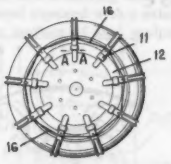
3,996,984

DEVICE FOR IMPROVING THE ADHESION OF THE WHEELS OF A VEHICLE

Filippo Mezzacapo, Corso Vittorio, 320, Velletri, Italy

Filed Apr. 24, 1975, Ser. No. 571,295
Claims priority, application Italy, May 6, 1974, 50791/74; Feb. 17, 1975, 48214/75
Int. Cl.² B60C *27/20*
U.S. Cl. 152—225 R **1 Claim**

1. A device for improving the traction of the tread of a wheel on a vehicle in the presence of snow or ice on a road, said device comprising a disc member having a diameter smaller than the diameter of the wheel and positionable adjacent the exterior side of the wheel, radial ways spaced apart on the disc member, spikes radially slidable in the ways and extending across at least a portion of the tread, elastic means for biasing the spikes toward the center of the ring thereby causing the spikes to contact the tread, and releasable means for preventing the spike from moving outwardly away from contact with the tread of the wheel if the elastic member breaks and for permitting removal of the spikes from the



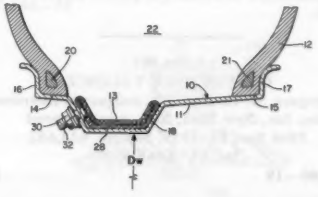
device for easy storage, said spike extends radially inward beyond the way when the device is mounted on the wheel and said releasable means includes stop members attachable to each of the spikes on a portion of the spike extending radially inward from the ways and includes an abutment means on the disc member adjacent which the stop member abuts to prevent the spike from moving out of contact with the tread.

3,996,985

INFLATABLE WELL FILLER FOR PNEUMATIC TIRE AND WHEEL ASSEMBLY

John M. Cady, Munroe Falls, and George T. Watts, North Canton, both of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed June 18, 1975, Ser. No. 588,100
Int. Cl.² B60C *5/08, 15/02*
U.S. Cl. 152—340 **5 Claims**



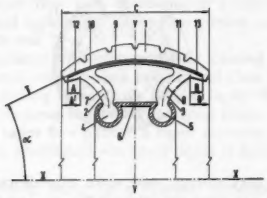
1. A tubeless pneumatic tire and wheel assembly including: a rim of the drop center type having a wheel well with an annular base surface, a pair of bead seats, a pair of annular flanges; means, separate and unattached to the tire, for preventing the beads of said tire from dropping into said wheel well in the event of loss of pressure in the tubeless pneumatic tire, said means including a continuous annular cord-reinforced inflatable tube disposed in the wheel well and resting against the annular base surface thereof, the tube having a relaxed, uninflated diameter which is substantially equal to the diameter of the annular base surface of the wheel well, the angle of the cords being such that the tube when uninflated, can be stretched over the rim flanges and contracted tightly against the base surface of the wheel well; and means for allowing fluid, under pressure, to enter the tube and fill it to a firm torus which fills the wheel well.

3,996,986

PNEUMATIC TIRES FOR VEHICLE WHEELS

Giorgio Tangorra, Monza (Milan), Italy, assignor to Industrie Pirelli S.p.A., Milan, Italy

Filed Apr. 22, 1974, Ser. No. 463,069
Claims priority, application Italy, Apr. 26, 1973, 23423/73
Int. Cl.² B60C 13/00, 9/18, 9/02
U.S. Cl. 152—353 C 6 Claims



1. A pneumatic tire for vehicle wheels comprising

a tread and two sidewalls comprising elastomeric material extending from the tread and terminating in beads for a rigid wheel rim,

said tread having lateral edges which extend axially outwardly as annular flanges beyond the connection zones between the tread and the sidewalls, said flanged tread being wider than any other part of the tire, said tread at said connection zones and at said lateral edges being detached from the ground when the tire is in normal service conditions,

an annular structure reinforcing said tread over substantially the whole of the width of the tread, said reinforcing structure being substantially inextensible under tire inflation pressure in both its circumferential and lateral directions, said annular structure extending into a substantial portion of said flanges,

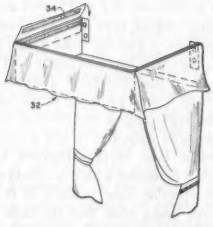
said sidewalls having a cross-sectional shape whose midline over substantially the whole length between the side edges of the tread reinforcement and the bead is convex with respect to the interior to the tire under tire inflation pressure, each of said sidewalls having in combination a bending stiffness, curvature and thickness sufficient to constrain the sidewall between said edges of the inextensible tread reinforcement and the bead seat on the wheel rim whereby on inflation of the tire and under service conditions, the sidewalls are placed under compressive stress.

3,996,987

CONVERTIBLE VALENCE

Edith Rodriguez, St. Thomas, V.I., assignor to Lawrence Peska Associates, Inc., New York, N.Y., a part interest

Filed Nov. 19, 1975, Ser. No. 633,652
Int. Cl.² E06B 9/00
U.S. Cl. 160—19 1 Claim



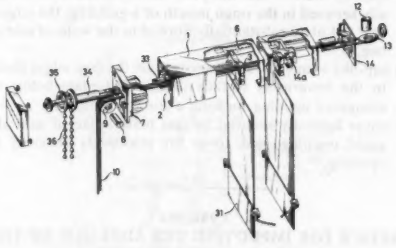
1. A valence for window decoration comprising a first rigid flat rectangular member, one end of which is adapted to be mounted substantially flush against a vertical wall surface, wall mounting bracket means secured to said end of said first member, said wall mounting bracket comprising a first flat plate secured at a substantially right angle to said first flat rectangular member for flushly engaging a vertical wall surface, means in said first plate for affixing a wall securing device thereto, a second rigid flat rectangular member one end of which extends at a substantially right angle from said first member and is of a sufficient length to span the width of a window, the other end of said second member extending to a substantially right angle to a third rigid flat rectangular member so that the top edge of said first, second and third members lie in substantially the same plane and the bottom edge of said first, second and third members lie substantially in the same plane, wall mounting bracket means secured to the end of said third member, said wall mounting bracket comprising a second flat plate secured at a substantially right angle to said third member for flushly engaging a vertical wall surface, means in said second plate for affixing a wall securing device thereto, fastening means secured to the inside of and extending horizontally along the inside walls of said first, second and third members for fastening a fabric cover to the outside of said valence said first and second members being of sufficient length to project beyond a window sill and are both the same length, said first, second and third members all being of a horizontal oblong configuration, said bracket on said first member and said bracket on said third member extending inwardly toward the center of said second member, said fastening means comprising a first Velcro strip, a removable cover extending horizontally around the exterior of said valence, said cover being of sufficient length to cover said valence, the top edge of said cover extending up and over the top of said valence and downwardly toward and over said first Velcro strip, a second Velcro strip secured to the face of said cover for joining to said first Velcro strip, said second Velcro strip being of substantially the same length as said first Velcro strip.

3,996,988

VENETIAN BLIND, PREFERABLY A VERTICAL BLIND

Hendrik de Wit, Rotterdam, Netherlands, assignor to Hunter Douglas Industries B.V., Rotterdam, Netherlands

Filed Jan. 16, 1976, Ser. No. 649,723
Claims priority, application Netherlands, Jan. 23, 1975, 7500815
Int. Cl.² E06B 9/26, 9/36
U.S. Cl. 160—168 R 10 Claims



1. A venetian blind, comprising

a. a movable driving shaft;

b. a movable driven shaft extending at an angle with respect to said driving shaft;

c. a slip coupling for connecting said driving shaft to said driven shaft; said slip coupling including means on said driving shaft having a boss shaped surface, and a first bush shaped gear tightly enclosing said boss shaped surface means and having a tooth means, one of said first gear and said surface means having a raised part by which said first gear contacts said surface means to tightly enclose said surface means; and

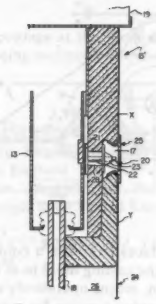
d. a second gear on the driven shaft and engaged by said tooth means of said first gear, said second gear having a first stop for stopping movement of said first gear, wherein said first gear may slip with respect to said surface means when said driving shaft moves and a part of said tooth means of said first gear comes in contact with said stop of said second gear.

3,996,989

INSULATING FRAME AND GLAZING FOR DOORS AND WINDOWS

Harlin J. Wall, State College, Pa., assignor to Leisure Life Inc., State College, Pa.

Filed Nov. 25, 1975, Ser. No. 635,252
Int. Cl.[2] E06B 3/30
U.S. Cl. 160—369 8 Claims



1. An apparatus for fitting over the inside frames and glass of doors and windows built into structures to prevent heat loss therethrough, said apparatus comprising:

removable framing means for completely covering all exposed portions of said inside frames from the glass surface to the structural material into which the frames are built, said framing means having a channel groove around the entire perimeter thereof;

fastening means attached to said inside frame and fitted through the channel groove in said framing means for removably fastening said framing means to said inside frame;

covering means stretched across said framing means and inserted into said channel groove for covering the area above the glass surface within the boundaries of said framing means; and

retaining means removably biased into said channel groove for retaining said covering means therein and covering said fastening means, whereby inserting said retaining means into said channel groove after the covering means has been stretched across the frame and inserted into the groove will hold the covering means tautly across the frame.

3,996,990

SCULPTURE FABRICATING METHOD

Paul L. DiMatteo, Huntington, N.Y., assignor to Dynell Electronics Corporation, Melville, N.Y.

Filed Feb. 24, 1975, Ser. No. 552,113
Int. Cl.[2] B22C 9/04; G01B 3/14
U.S. Cl. 164—17 17 Claims

1. A sculpture fabricating method comprising the steps of: defining the exterior surface of the sculpture to be fabricated; forming a first cast of a first material and having an exterior surface spaced inwardly by a predetermined amount from said exterior surface of said sculpture, the exterior surface of said first cast having profiles corresponding substantially to respective profiles of the exterior surface of said sculpture; covering the surface of said first cast with a layer of predetermined thickness, the exterior surface of said layer being substantially identical to the exterior surface of said sculpture; embedding said first cast with said layer within a second material; removing said layer from the interior of said second material, the removal of said layer leaving a vacant space between said second material and said first cast; filling said vacant space with a third material; and removing said second material to leave said third material exposed with a exterior surface identical to said exterior surface of said sculpture, said step of

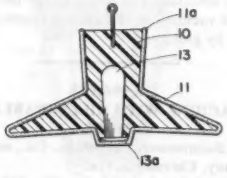
forming said first cast including the step of controlling the spacing between the exterior surface of said first cast and the exterior surface of said sculpture so that said spacing is of substantially uniform depth, the thickness of said layer being controlled so that said thickness is substantially uniform, the internal surface of said third material having a profile corresponding geometrically to the profile of the exterior surface of said third material, the spacing between said exterior surface of said first cast and said exterior surface of said sculpture being measured normal to both said exterior surfaces.

3,996,991

INVESTMENT CASTING METHOD

Ken Ugata, Nara; Yasuji Morita, Kobe, and Yasuharu Mine, Osaka, all of Japan, assignors to Kubota, Ltd., Osaka, Japan

Filed Nov. 6, 1974, Ser. No. 521,533
Claims priority, application Japan, Nov. 13, 1973, 48-127850; Mar. 19, 1974, 49-31881
Int. Cl.[2] B22C 09/04
U.S. Cl. 164—35 17 Claims



1. An investment casting method for making a desired casting, which comprises:

the step of preparing a thermally fusible pattern from one member selected from the group consisting of naphthalene and p-dichlorobenzene, with or without the addition of a small amount up to about 10% by weight of a polymer having a vinyl radical, which thermally fusible pattern is substantially a replica of the desired casting,

the step of forming a refractory investment casting enveloping the thermally fusible pattern by coating a refractory slurry around said thermally fusible pattern,

the step of melting the thermally fusible pattern so as to leave the refractory investment having a cavity that has been occupied by said thermally fusible pattern, said

cavity having all the details of said thermally fusible pattern,

the step of heating said refractory investment within an oven to remove all the residue of the thermally fusible pattern out of said refractory investment and to provide a rigid ceramic mold of one-piece construction,

the step of pouring molten metal into said mold while the latter is heated to minimize the temperature difference between said mold and said molten metal,

the step of solidifying said molten metal within said mold, and

the step of removing the solidified metal in the form of the desired casting out of said mold.

3,996,992

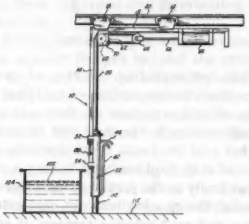
METHOD OF VACUUM CASTING MOLTEN METAL

Charles W. Johnson, P.O. Box 96, Princeton, Iowa 52768

Filed Mar. 17, 1975, Ser. No. 558,704

Int. Cl.² B22D *27/16, 29/00*

U.S. Cl. 164—63 **6 Claims**



1. A method of vacuum casting molten metal from a contained supply thereof, comprising the steps of:

lowering the open bottom end of a water jacketed mold into the molten metal,

inducing a vacuum on the mold to draw a column of molten metal into the same,

circulating water through the water jacket of the mold to effect rapid hardening of the column, removing the mold and allowing the contained heat in the hardened casting to reheat the mold and expand it relative to the casting from the supply of molten metal and then away from the container therefor,

stopping the circulation of water to the mold, and

releasing the vacuum on the mold to permit the casting to drop free by gravity.

3,996,993

CASTING MACHINE WITH CHANGEABLE LENGTH OF MOLD

Yves Bernard Bonnamour, Carrollton, Ga., assignor to Southwire Company, Carrollton, Ga.

Filed July 16, 1974, Ser. No. 488,898

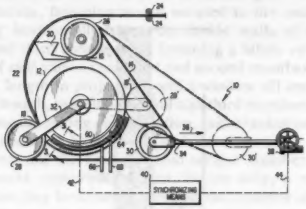
Int. Cl.² B22D *11/06*

U.S. Cl. 164—87 **16 Claims**

1. In a wheel-band type continuous casting machine for casting molten metal into a continuous bar comprising a rotatable casting wheel having a casting groove formed in the periphery thereof which is closed along a portion of its length by an endless band forming a casting mold therewith, said band having inner and outer surfaces and being guided about said casting wheel by a plurality of guide wheels with said inner surface engaging said guide wheels and said outer surface engaging said casting wheel, said band initially engaging the periphery of said casting wheel at a first point defining a mold inlet and disengaging said casting wheel at a second point defining a mold outlet;

the improvement comprising means for synchronously moving at least two of said guide wheels for varying the angular position of said second point with respect to said casting wheel during the casting operation to substantially change the length of band covering said casting groove.

12. In a wheel-band type continuous casting machine for casting molten metal into a continuous bar comprising a rotatable casting wheel having a casting groove formed in the periphery thereof which is closed along a portion of its length by an endless band forming a casting mold of a given length therewith, said band initially engaging the periphery of said wheel at a first point defining a mold inlet and disengaging said wheel at a second point defining a mold outlet; the improvement comprising means for rotating the casting wheel at a first rate of rotation, means positioned adjacent the mold inlet for pouring molten metal into said inlet at a rate consonant with the first rate of rotation of the casting wheel, means associated with the casting machine for applying a cooling medium



against the mold surfaces to obtain a cooling gradient across the molten metal in the casting mold to at least partially solidify the molten therein, means operatively associated with said pouring means and applying means for controlling the pouring means and the cooling medium applying means to establish an equilibrium casting condition, means operatively associated with said rotating means for increasing the rotation rate of the casting wheel to a second rate of rotation after establishment of said equilibrium casting condition, means associated with said endless band for decreasing the length of the band covering the casting groove during the casting operation and after establishment of said equilibrium casting condition, and means associated with said casting machine for applying a cooling medium directly against the at least partly solidified metal in the casting groove exposed by the decreasing of the length of the band covering the casting groove to thereby maintain said cooling gradient at the increased casting rate.

3,996,994

SUPPLYING MOLTEN METAL TO A MOLD FOR CONTINUOUS CASTING

Hans Schrewe, Duisburg, and Klaus Frenken, Krefeld-Bockum, both of Germany, assignors to Mannesmann Aktiengesellschaft, Dusseldorf, Germany

Filed Sept. 2, 1975, Ser. No. 609,645

Claims priority, application Germany, Sept. 2, 1974, 2442187

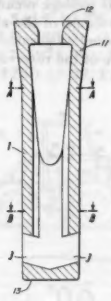
Int. Cl.² B22D *11/10*

U.S. Cl. 164—281 R **2 Claims**

1. A discharge pipe in combination with a mold, for feeding molten material into the mold for continuous casting, the mold having rectangular cross-section for casting ingots of rectangular cross-section, the pipe being disposed to be submerged partially in the molten material, said discharge pipe comprising an upper conical portion converging downwardly into a lower portion, said lower portion having inner and outer essentially rectangular parallel cross-sections at least in the region of submerse into the molten material in the mold said inner rectangular cross-section having a maximum diagonal smaller than the minimum diameter of the upper portion;

the pipe being disposed so that the long sides of the lower rectangular portion extend parallel to the long mold sides; and

the pipe being closed at the bottom and having lateral,



straight exit openings at the short sides of the rectangle, the openings being inclined relative to a horizontal plane.

3,996,995

CONTINUOUS CASTING MOULD

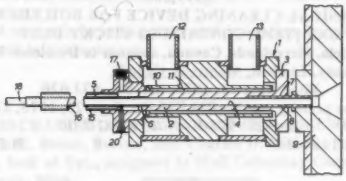
John Marsh, Bedford, England, assignor to Davy International Limited, London, England

Filed Nov. 26, 1975, Ser. No. 635,289

Claims priority, application United Kingdom, Nov. 28, 1974, 51625/74

Int. Cl.² B22D *11/04, 11/124*

U.S. Cl. 164—283 M 5 Claims



1. A continuous casting mould including a first metal body defining a mould cavity therethrough, means associated with the body by which liquid coolant can be supplied to the outer surface of the body, a second metal body in the form of a tube having a bore with substantially the same cross-sectional dimensions as those of the mould cavity, said bodies being arranged such that the longitudinal axis of the mould cavity and the tube are substantially horizontal and aligned so that the bore in the second body forms an axial extension of the mould cavity, and means associated with the second body by which liquid coolant can be supplied to the outer surface of the tube and allowed to flow over the end of the tube which is away from the first body.

3,996,996

APPARATUS FOR THE PRODUCTION OF CASTINGS

Marius Gunnergaard, Lyngby, Denmark, assignor to Dansk Industri Syndikat A/S, Herlev, Denmark

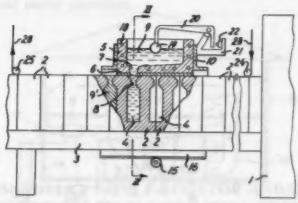
Filed Aug. 27, 1975, Ser. No. 608,335

Claims priority, application Denmark, Sept. 11, 1974, 4797/74

Int. Cl.² B22C *9/20*

U.S. Cl. 164—323 7 Claims

1. An apparatus for the production of castings in a mould consisting of a continuous series of identical sand mould parts and presenting, at each vertical joint between successive mould parts, at least one mould cavity having a pouring inlet extending upwardly to the top surface of the mould, comprising a straight horizontal guideway forming a support for the mould and permitting a stepwise advancement thereof, a pouring sow provided above said guideway and having a bottom resting slidingly on said top surface and presenting at least one outlet, means to adjust the position of said pouring sow with respect to said mould such that said outlet communicates successively with the inlets of the mould in the periods of



stand-still between successive advancements thereof to automatically deliver a charge of molten casting material from said pouring sow to said mould cavities, and means to prevent sand particles from becoming dislodged from said top surface of the mould by frictional engagement thereof with said pouring sow bottom whereby said cavities may be successively filled without damage to the mould or contamination to the castings.

3,996,997

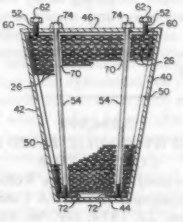
TIGHTENING OF HEATING ELEMENTS OF A REGENERATIVE AIR HEATER

John William Regan, Windsor, and Robert Leo Olson, Enfield, both of Conn., assignors to Combustion Engineering, Inc., Windsor, Conn.

Filed Dec. 22, 1975, Ser. No. 643,437

Int. Cl.² F28D *19/04*

U.S. Cl. 165—8 4 Claims



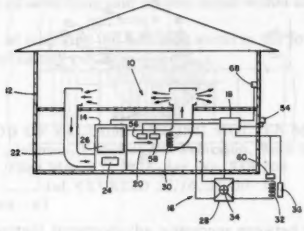
1. A rotary regenerative heat exchanger including a rotor, a substantially cylindrical, stationary housing enclosing the rotor, a central shaft around which the rotor rotates, means for rotating the rotor, said rotor including a plurality of sectorial baskets, each basket having a pair of side plates, an outer peripheral end plate, and an inner peripheral end plate, a plurality of separate, parallel, substantially flat heating plates stacked one adjacent the other so as to fill each basket, said heating plates being positioned so as to be parallel with the end plates, and bolt means secured to the outer peripheral plate of each basket, each bolt means having a portion coacting with the heating plates in such a manner that adjusting the bolt means causes the heating plates to be forced closer and tighter together.

3,996,998

COMBINATION FURNACE—HEAT PUMP UNIT

Michael G. Garst; Donald D. Towe; Philip L. Zink, and Theodore P. Gilles, all of Marshalltown, Iowa, assignors to Lennox Industries Inc., Marshalltown, Iowa

Filed Nov. 27, 1974, Ser. No. 523,419
Int. Cl.² F25B *29/00*; F28F *27/00*
U.S. Cl. 165—12 13 Claims



1. A system for conditioning the air in the enclosure, said air having an indoor temperature, comprising in combination:

furnace means for delivering supply air to said enclosure, said supply air having a supply air temperature;

heat pump means for conditioning said supply air, said heat pump means including an inside coil, an outside coil and compressor means, said inside coil communicating directly with said supply air downstream from said furnace means;

thermostatic means for sensing said indoor temperature, said thermostatic means having a first and second predetermined threshold temperature setting; and

control means for coordinately controlling said furnace means and said heat pump means, said control means being responsive to said thermostatic means, said control means being operable in a first state whenever said first predetermined threshold temperature setting exceeds said indoor temperature and at least a second state whenever said second predetermined threshold temperature setting exceeds said indoor temperature, said control means activating said heat pump means alone in said first state, whereby said inside coil heats said supply air, and activating said furnace means alone in said second state, said control means including delay means for delaying activation of said heat pump means as said control means switches from said second state to said first state, said delay means substantially avoiding excessive pressure in said inside coil.

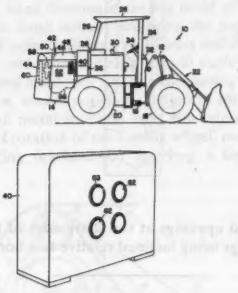
3,996,999

VEHIGLE AND HYDRAULIC FLUID RESERVOIR COMBINATION

Charles George Termont, and Wayne Russel Miller, both of Dubuque, Iowa, assignors to Deere & Company, Moline, Ill.

Filed Feb. 22, 1974, Ser. No. 444,981
Int. Cl.² F28F *1/00*; B60K *11/06*
U.S. Cl. 165—41 6 Claims

1. In a vehicle including a longitudinal frame supporting, in longitudinal alignment, an engine, an engine coolant conveying radiator spaced from the engine, a driven fan located adjacent the radiator, an operator's station having an upright transverse wall facing in the direction of the engine, a pair of side walls extending longitudinally at opposite sides of the engine, fan and radiator and joined by a top wall extending over the engine, fan and radiator to thus define a compartment, and a hydraulic fluid reservoir for containing hydraulic fluid for operating various hydraulic functions associated with the vehicle, the improvement comprising: said reservoir being located adjacent to and at least substantially blocking one end of said compartment; said reservoir including first and second upright, transverse longitudinally spaced walls having open-ended longitudinally extending air duct means passing therethrough and defining air passage means communicating with the compartment; the volume of the air duct means between the open ends thereof being no greater than about one-fifth of the fluid holding volume of the reservoir; said reservoir, compartment, fan and radiator cooperating to define a cooling system; said upright wall of the operator's station being spacedly adjacent the cooling system so as to leave a gap, exposed to ambient air, between the last-named wall and the cooling system, whereby operation of the fan will result in a stream of air being moved through the compartment, duct means and gap.

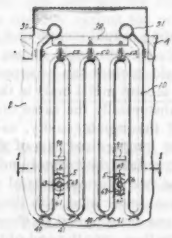


3,997,000

MECHANICAL CLEANING DEVICE FOR BOILERS WITH GAS FLOW CONTAINING STICKY DUST

Adam Piela, Pierrefonds, Canada, assignor to Dominion Bridge Company, Limited, Montreal, Canada

Filed Nov. 14, 1975, Ser. No. 632,020
Claims priority, application Canada, Sept. 25, 1975, 236320
Int. Cl.² F28D *11/06*; F28G *7/00*
U.S. Cl. 165—84 8 Claims



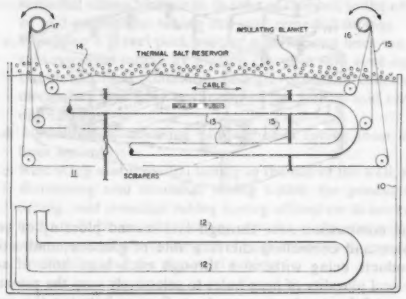
1. A tubular heat exchanger comprising a duct for the passage of hot gases therethrough, at least two vertically aligned parallel rows of serpentine tubes wherein each row has at least one upper loop and at least one lower loop and wherein said upper loop and said lower loop in each row are in line and parallel to a line transverse to the rows of tubes, means for flexibly suspending the tubes within said duct, first knocker plates on the opposed transverse face of each lower loop in each of said tubes, second knocker plates on both transverse faces of the upper loop in each of said tubes, at least one rapping rod positioned intermediate the upper loop and the lower loop in each row and extending between the tubes in a direction transverse to the rows, said rapping rod including at least one horizontally opposed rapping lug located adjacent at least one row of tubes, and rapping means adapted to deliver a reciprocating motion to the rapping rod.

3,997,001

HEAT ENERGY RESERVOIR USING SOLID REMOVAL AND GRAVITATION SETTLING IN A MOLTEN-SOLID SALT BATH

Talbot A. Chubb, 5023 N. 38th St., Arlington, Va. 22207

Filed Apr. 17, 1975, Ser. No. 568,971
Int. Cl.² F28D 19/00; F28G 1/08
U.S. Cl. 165—94 4 Claims



1. A heat sink reservoir, heat storage, heat transfer assembly which comprises:

a salt eutectic;

means for transferring heat to said salt eutectic;

means for transferring heat from said salt eutectic to a medium for receiving said heat;

means for scraping "frozen" salt from said means that transfers heat from said salt eutectic to the medium to receive heat,

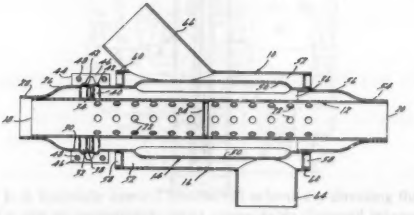
said reservoir including a thermal insulation layer covering said salt eutectic.

3,997,002

AIRCRAFT MUFFLER AND HEATER ASSEMBLY

Marvin E. Baker, Boerne, and Charles D. Nichols, San Antonio, both of Tex., assignors to Wall Colmonoy Corporation, Detroit, Mich.

Filed July 16, 1975, Ser. No. 596,401
Int. Cl.² F28D 7/10
U.S. Cl. 165—154 11 Claims



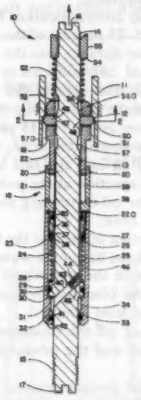
1. An aircraft muffler and cabin air heater assembly or the like comprising an elongated gas flow conduit having an inlet end and an outlet end and formed with an annular connector around one end portion thereof, an elongated inner shell disposed in encircling spaced relationship around a substantial portion of said conduit and defining therebetween an annular inner chamber, said inner shell having one end thereof necked down to slidably overlie and engage the other end portion of said conduit and having the opposite end thereof removably coupled to said annular connector at said one end portion forming a substantially gas-tight connection, said conduit formed with a gas flow obstruction at a position intermediate the ends thereof and provided with perforations through the walls thereof in a region upstream and downstream of said obstruction for providing communication between the interior of said conduit and said inner chamber, and an outer shell removably mounted in encircling spaced relationship around said inner shell including axially spaced end walls defining in combination an outer chamber which is axially spaced from said connection, said outer shell formed with inlet means and outlet means for passing air in heat exchange relationship through said outer chamber.

3,997,003

TIME DELAY NIPPLE LOCATOR AND/OR DECELERATOR FOR PUMP DOWN WELL TOOL STRING OPERATIONS

Joel E. Adkins, Carrollton, Tex., assignor to Otis Engineering Corporation, Dallas, Tex.

Filed June 9, 1975, Ser. No. 585,298
Int. Cl.² E21B 47/00
U.S. Cl. 166—113 14 Claims



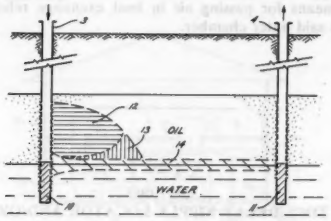
1. A yieldable detent mechanism comprising first and second mutually telescopical cylindrical body members including an inner body member and an outer body member, the respective diameters of which define an annulus between said body members; spring loading means cooperatively engaging each of said body members to define a quiescent relative telescoped position therebetween; first and second slideable pressure sealing means between the inner and outer body members, at the respective longitudinal ends of said annulus; a further common sliding pressure sealing means between said body members and intermediate the longitudinal extremes of said annulus, to define first and second complementary pressure sealed chambers in said annulus; a restricted fluid communication means extending between said first and second pressure sealed chambers; and detent means carried by said outer body member and including radially retractable dog members, the radial extremes of which extend beyond the outside surface of said outer body member with said first and second body members in the quiescent relative position therebetween, having means to enable said dog members to be retractable radially inwardly upon a predetermined longitudinal travel of one body member with respect to the other of said body members being effected from the relative quiescent longitudinal positional relationship therebetween.

3,997,004

METHOD FOR RECOVERING VISCOUS PETROLEUM

Ching H. Wu, Golden, Colo., assignor to Texaco Inc., New York, N.Y.

Filed Oct. 8, 1975, Ser. No. 620,667
Int. Cl.[2] E21B 43/24
U.S. Cl. 166—251 8 Claims



1. A method for recovering viscous petroleum from a subterranean, permeable, viscous petroleum-containing formation overlying and in contact with a water-saturated formation, said petroleum formation being penetrated by at least two wells which penetrate the water-saturated zone by a distance equal to at least 10% of the thickness of the petroleum-containing zone, comprising:

a. establishing fluid communication between the first well and the bottom 5–25 percent of the petroleum-containing zone and a similar distance into the water-saturated zone;

b. establishing fluid communication between the second well and the full thickness of the petroleum-containing zone plus a distance into the top of the water-saturated zone equal to from about 5 to 15 percent of the thickness of the petroleum-containing zone;

c. injecting heated air into the first well to establish an in situ combustion reaction at the point of contact between the bottom of the oil-containing zone and the top of the water-saturated zone;

d. continuing injection of air into the bottom of the oil-containing zone and the top of the water-saturated zone until the temperature in the petroleum formation above the zone in which the combustion reaction is occurring has been raised to at least 200° F.

e. thereafter closing off the fluid communication between the injection well and the production well in the water-saturated zone;

f. establishing fluid communication in the injection well throughout the full thickness of the petroleum-containing zone; and

g. injecting steam into the injection well and producing petroleum from the production well.

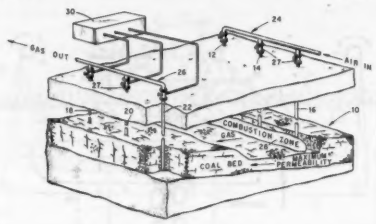
3,997,005

METHOD FOR CONTROL OF SUBSURFACE COAL GASIFICATION

Charles A. Komar, Uniontown, Pa., assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Oct. 23, 1975, Ser. No. 625,273
Int. Cl.[2] E21B 43/24
U.S. Cl. 166—251 3 Claims

1. A method for in situ gasifying a subterranean coalbed comprising the steps of penetrating the coalbed with a first plurality of bore holes arranged in general alignment and spaced apart from one another along a plane perpendicular to the plane of maximum permeability in said coalbed, penetrating the coalbed with a second plurality of spaced-apart bore holes arranged generally parallel to said first plurality of bore holes and spaced therefrom a preselected distance along a plane parallel to the maximum permeability of said coalbed, initiating combustion in said coalbed contiguous to said first plurality of bore holes, interconnecting the first plurality of bore holes in the coalbed to form a single combustion zone in registry with all of said first plurality of bore holes, introducing combustion supporting gas into said first plurality of bore holes at a rate sufficient to support and maintain the combustion zone, withdrawing gaseous products of combustion from



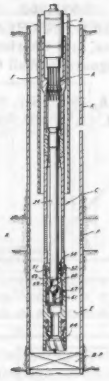
said combustion zone through said second plurality of bore holes, and controlling the flow rate of gaseous combustion products being withdrawn through each bore hole of said second plurality of bore holes to selectively vary the pressure drop of the combustion products flowing between the combustion zone and each of said second plurality of bore holes to provide and maintain a uniform propagation of said combustion zone towards said second plurality of bore holes.

3,997,006

WELL TOOL HAVING AN HYDRAULICALLY RELEASABLE COUPLER COMPONENT

Rodney J. Wetzel, St. Martinville, La., assignor to Hydraulic Workovers, Inc., Houma, La.

Filed Dec. 20, 1974, Ser. No. 534,757
Int. Cl.[2] E21B 43/08, 23/00
U.S. Cl. 166—315 20 Claims



1. An apparatus for gravel packing and producing a production zone in a subterranean well through production tubing inserted therein, at least a portion of said apparatus being inserted into the well through the production tubing and activated utilizing remedial tubing inserted through said production tubing, said apparatus comprising: an hydraulically releasable coupler affixed to the lower end of said remedial tubing for selective disengagement of the remedial tubing from the apparatus and having a member defining a receptacle for receipt of a member having a packer, a liner assembly depending from said hydraulically releasable coupler, said liner assembly being lowerable into the well with the hydraulically releasable coupler, and a tubular member in association

with said remedial tubing having a packing element, said tubular member being at least partially insertable within said receptacle member of said hydraulically releasable coupler.

18. A method of gravel packing a production zone in a subterranean well through production tubing inserted therein comprising the steps of:

a. Inserting remedial tubing through said production tubing;

b. Flushing said production zone with fluid pumped to said zone through one of said production tubing and said remedial tubing, thence to the top of the well to the other of said production tubing and said remedial tubing;

c. Providing a gravel pack around a perforated liner run on said remedial tubing by placing gravel in said zone upon circulating fluid containing said gravel in said zone, and circulating said fluid to the top of the well to said remedial tubing;

d. Hydraulically releasing said remedial tubing from said liner assembly;

e. Removing said remedial tubing to the top of the well; and

f. Rerunning said remedial tubing within the production tubing, said remedial tubing having affixed on its lowered end a tubular member having a packing element to provide a packoff above the gravel pack between the production tubing and the remedial tubing.

3,997,007

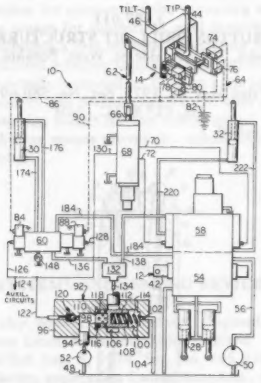
IMPLEMENT POSITIONING HYDRAULIC CONTROL SYSTEM

John A. Junck, Joliet, and Larry W. Lorimor, Crest Hill, both of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed July 14, 1975, Ser. No. 595,819

Int. Cl.² E02F *3/76*

U.S. Cl. 172—804 **4 Claims**



1. A hydraulic control system, for selectively directing fluid to a pair of reciprocable jacks connectably disposed intermediate a frame and an implement for tilting and tipping the implement relative to the frame, comprising;

a fluid supply source;

a flow divider valve in fluid communication with said fluid supply source for providing equal fluid flow to a pair of outlet paths;

first control valve means including a control valve for selectively communicating fluid from one of said outlet paths to either end of one of said jacks; and

second control valve means including an electrically actuated, hydraulically pilot operated control valve for selectively communicating fluid from the other one of said outlet paths to either end of the other one of said jacks.

3,997,008

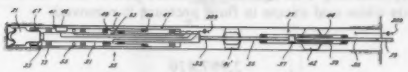
DRILL DIRECTOR

Jackson M. Kellner, Midland, Tex., assignor to Smith International, Inc., Midland, Tex.

Continuation of Ser. No. 505,450, Sept. 13, 1974, abandoned, which is a continuation of Ser. No. 419,106, Nov. 26, 1973, abandoned. This application June 9, 1975, Ser. No. 584,736

Int. Cl.² E21B *47/022, 7/06*

U.S. Cl. 175—45 **23 Claims**



2. An in-hole drilling apparatus for use with a drill bit and adapted to be run in a hole being made, said apparatus comprising:

an in-hole motor having a shaft rotated when said motor is actuated, said shaft being adopted to rotate such drill bit.

a deflection barrel rotatable about the shaft axis, said barrel including means extendable from the side thereof to engage one side of a hole being drilled and means to push said shaft laterally toward the opposite side of the hole, and

entirely in-hole positioning means for turning said barrel to desired azimuthal position relative to the axis of rotation of said motor shaft and holding it in that position.

3,997,009

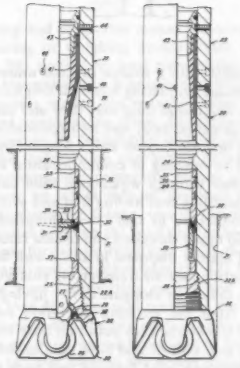
WELL DRILLING APPARATUS

Fred K. Fox, Houston, Tex., assignor to Engineering Enterprises Inc., Houston, Tex.

Filed Jan. 31, 1975, Ser. No. 545,826

Int. Cl.² E21B *3/12;* **F16K** *15/18*

U.S. Cl. 175—107 **9 Claims**



1. For use in drilling a well, apparatus comprising a tubular body having upper and lower ends connectible in a drill string, and a downwardly facing annular seat within the bore of the tubular body, a closure member, means mounting the closure member in the bore of the tubular body for movement from a position across the seat to close the bore to a position removed from the seat to open the bore in response to fluid pressure thereabove, means urging the closure member to closed position, a plurality of small ports in the wall of the tubular body connecting the bore of the tubular body above said seat with the exterior thereof, and a sleeve of flexible material having an outer diameter which, in the absence of a difference in fluid

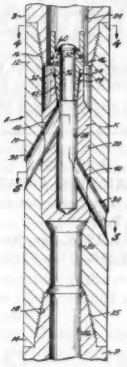
pressure in the bore above the seat and exteriorly of the body, fits tightly against the wall of the tubular body throughout substantially its entire length so as to close the ports while providing a substantially uninterrupted flow path through the bore, one end of the sleeve being supported within the bore, and the other end of the sleeve being free to flex inwardly to open the ports in response to fluid pressure exteriorly of the body which exceeds that in the bore above said seat by a predetermined amount, said other end of the sleeve automatically returning to its tight fit against the wall so as to close said ports when said excess in fluid pressure is removed.

3,997,010

DOWNHOLE FORWARD AND BACK SCUTTLING TOOL

Harry Lee Rilling, Long Beach, Calif., assignor to Midway Fishing Tool Company, Long Beach, Calif.

Filed Mar. 1, 1976, Ser. No. 662,542
Int. Cl.² E21B *27/00, 41/00*
U.S. Cl. 175—242 **14 Claims**



1. In combination with a source of fluid under pressure, a power driven tubular drill string having a longitudinal passage therein through which said fluid may flow and said drill string having a lower threaded end, and an expandable reamer assembly having a threaded upper end a longitudinal passage in said reamer and an opening in communication with said passage in said reamer through which said fluid can exit, a forward and back scuttling tool having first and second threaded ends that are connected to said lower threaded end of said drill pipe and said upper threaded end of said reamer, said drill string, tool, and reamer disposed in an oil well bore hole that has the lower portion thereof transversely enlarged by a reaming operation to define an elongate cavity having a bottom on which cuttings from the reaming operation rest, said drill string of smaller transverse area than said bore hole and cooperating with the side wall of said bore hole to define an annulus space therebetween, said forward and back scuttling tool including:

a. an elongate shell having first and second ends on which first and second threads are defined that engage said lower threaded end of said drill string and said upper threaded end of said reamer, said shell having a longitudinally extending interior cylindrical side wall, and said shell having at least one transverse port therein, said shell of sufficient strength as to permit torque to be transmitted from said drill string to said reamer to rotate the latter and form a portion of said bore hole into said elongate cavity;

b. a rigid cup-shaped body of non-circular transverse cross-section that has a first end surface, first and second exterior side wall surfaces, and a recess that extends inwardly from said first end surface, said body disposed within said shell, said body having at least one of said exterior side wall surfaces rigidly secured to said interior cylindrical side wall, said body having at least one transverse passage therein that maintains communication between said port and said recess, said second exterior side wall surface and said interior cylindrical side wall cooperating to define at least one longitudinal passage therebetween through which said fluid may flow from said longitudinal passage in said drill string to said reamer; and

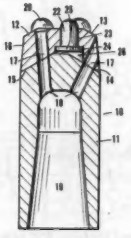
c. check valve means on said first end of said body which in a first position prevent said fluid under pressure that flows downwardly through said longitudinal passage in said drill string from entering said recess, with said forward and back scuttling tool selectively permitting said fluid under pressure to flow either through a first path that includes said longitudinal passages in said drill string, shell and reamer and said opening in the latter and said annulus space during the reaming operation or through a second path during the cuttings retrieving operation, said second path including downward flow of said fluid through said annulus space into said cavity in which said cuttings are disposed to create a turbulent flow of fluid in said cavity sufficient to lift said cuttings from said bottom and said cuttings become entrained with said fluid, said fluid with entrained cuttings flowing through said port into said transverse passage to enter said recess in said body and flow upwardly therefrom by moving said check valve from said first position to a second position, and said fluid with said entrained cuttings flowing upwardly in said longitudinal passage in said drill pipe to the ground surface.

3,997,011

BUTTON DRILL BIT STRUCTURE

Otto R. Staroba, 299 Adelaide St. West, Toronto 2B, Ontario, Canada

Filed May 27, 1975, Ser. No. 580,608
Int. Cl.² E21C *13/08*
U.S. Cl. 175—400 **9 Claims**



1. A rock bit of the button type comprising: a drill head body; a bit face part; a friction weld solely and rigidly joining said bit face part to said body; a plurality of bores in the bit face part of said body extending substantially from the drill head body through said bit face part to exterior surfaces of the latter; insert cutters in certain of said bores, each of said cutters having a body portion within such bore and carrying an enlargement determining the outward limit of location of said cutter in said bore relative to said drill head body and defining with said bore and said drill head body a cavity beneath said insert cutter above said head and within said bit face part; and weld material extending into said cavity and supporting said insert cutter in said bore.

3,997,012

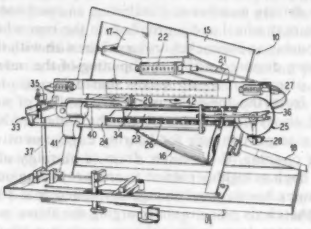
ROLLER ASSEMBLY

Robert B. Chambers, 607 Krall St., Boise, Idaho 83702

Filed Feb. 27, 1975, Ser. No. 553,736

Int. Cl.² G01G *11/14, 1/38, 1/36;* F16H *21/12*

U.S. Cl. 177—16 6 Claims



1. A device for converting a constant rotational input into a rotational output which is proportional to a separate input signal comprising a first member and a second member, each of said members having a surface of revolution about an axis with the surface of at least one of said members having an axially changing diameter, means for mounting said first and second members for rotation in a frame with their surfaces adjacent one another, means for rotating the first member, transfer means for engaging the surfaces of the first and second members and for transmitting rotation of the first member to the second member, means for supporting the transfer means in said frame, and means for shifting the transfer means on the means for supporting along the axis of one of said first and second members to vary the rate of rotation of the second member, said transfer means including a pair of rollers, means for mounting the rollers for rotation on parallel axes in a plane of rotation and pivot means having a pivot axis lying in said plane of rotation for connecting the mounting means for the rollers to the means for supporting, said mounting means for the rollers including a first member supporting one of the pair of rollers, a second member supporting the other of the pair of rollers and pivotally mounted on the first member, and means biasing the rollers into rolling engagement with each other so that said mounting means for the rollers pivots on said pivot axis as the shifting means moves the rollers along the axis of the one member.

3,997,013

SORTING SYSTEMS AND SENSING DEVICES FOR USE THEREWITH

Richard Morley Brook, Huddersfield, England, assignor to AutoSystems Limited, Huddersfield, England

Filed Aug. 5, 1974, Ser. No. 495,016

Claims priority, application United Kingdom, Aug. 7, 1973, 37314/73; Sept. 29, 1973, 45643/73; Feb. 14, 1974, 6711/74; May 30, 1974, 23959/74

Int. Cl.² G01G *13/00*

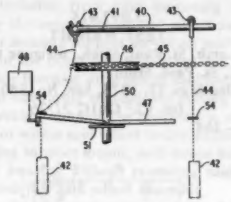
U.S. Cl. 177—52 4 Claims

1. A weight sensing device for use with apparatus for sorting articles which are moving along a path, comprising:

a. an electronic transducer arranged to emit a signal related to the weight of each article sensed by the device as each article moves through a weighing station located along at least a portion of said path,

b. at least one member rotatable about a fixed axis at said weighing station and including means to both receive and support each article as said article passes through said weighing station, and

c. means to transmit a load to said transducer and positioned in the path of said rotatable member such that said rotatable member while supporting said article must rise



and ride over said means to apply its load to said means and transducer.

3,997,014

MOUNTING AND PROTECTIVE MEANS IN FORCE MEASURING OF WEIGHING DEVICES

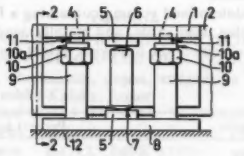
Arne Söderholm, and Alf Fluur, both of Bromma, Sweden, assignors to S.E.G. Instrument AB, Vallingby, Sweden

Filed Oct. 6, 1975, Ser. No. 620,065

Claims priority, application Sweden, Oct. 23, 1974, 74133133

Int. Cl.² G01G *23/02*

U.S. Cl. 177—128 6 Claims



1. Mounting and protective means intended to be part of a force measuring or weighing device which consists of load carriers (2, 39) carried by load transmitting means (6, 40), whose load transmission is a measure of the load, and which load transmitting means are movable from their respective desired initial positions to allow displacements of the load carrier relative to its foundation (12) in at least the plane normal to the transmission and action direction of the load, the said mounting and protective means consisting of two parts in a row on either side of the load transmitting and displacement-absorbing means, one of the said parts (1, 38) being positioned between the load carrier and the load transmitting means, for transmitting load from the load carrier to the said means, and the other part (8, 42) being positioned between the load transmitting means and the foundation, transmitting load from the said means to the foundation,

characterized in that the two parts (1, 38) and 8, 42 respectively) may be arranged to assume at least two positions relative to each other in the action direction of the load,

and that in one such position the two parts have load transmitting contact with each other and are mutually fixed in that position so as to not permit motion in the plane normal to the action direction of the load, which causes the load transmitting means to assume the said initial position.

and in another mutually fixed position, possibly coincident with said one position, the position is so adjusted that the load transmitting means (6, 40) may be brought into or out of the mounting and protective means,

and in a further position, when measuring, the parts of the mounting and protective means have no load transmitting contact with each other, and free movements between the

parts are admitted to suitable movement distances determined by plays between the parts.

3,997,015
TEST WEIGHT

Bernard M. Lamb, St. Paul, Minn., assignor to Allied Weight System Inc., St. Paul, Minn.

Filed May 27, 1975, Ser. No. 580,606
Int. Cl.² G01G *21/26*
U.S. Cl. 177—264 **2 Claims**

1. Test weight standard means for scale weight calibration purposes having a density of between 7 and 9 grams per cubic centimeter and including:

a. steel shell means forming a durable enclosure, with said shell means comprising walls enclosing a certain predetermined volume therewithin said enclosure including lifting means;

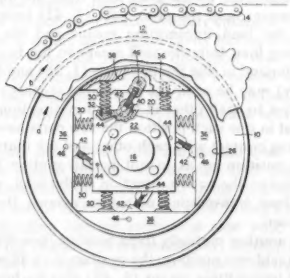
b. said predetermined volume containing a fill of a mixture of lead slag, lead oxide, and metallic lead, with the test weight containing the following weight contributing components:

Component	Percent by Weight
Lead slag	50%
Lead oxide	20%
Metallic lead	7.5%
Steel shell	22.5%

3,997,016
MOTORCYCLE SAFETY HUB

Joseph S. Zeigler, 855 John Fitch Highway, Fitchburg, Mass. 01420

Filed Apr. 16, 1975, Ser. No. 568,627
Int. Cl.² B62D *3/00*
U.S. Cl. 180—33 B **1 Claim**

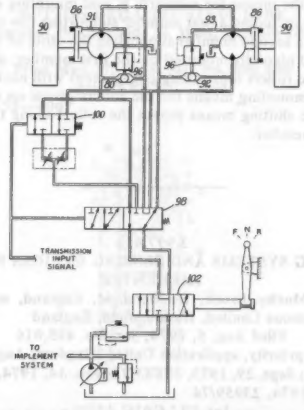


1. In a mechanism for controlling torque input to a motorcycle rear wheel in the event of a mechanical failure of the motorcycle engine or drive train and having the characteristic of being automatically changeable from a primary driving mode to a secondary failure mode, the improvement in means for automatically disconnecting the rear wheel from the drive train comprising: a rotatable driving member, a rotatable driven member, means for stationarily locking the driving member to the driven member in the driving mode and adjusting for slippage when the torque exceeds the maximum engine torque for freedom of rotation of the driven member independent of the driving member and including an open outer drum fixed to the rear wheel and journalled on the rear wheel axle, an inner housing and sprocket unitary therewith with the inner housing being disposed within the opening of the outer drum, a plurality of pairs of spring means seated in and projecting outwardly from the inner housing, a plurality of arcuately configured shoes each disposed on the outer ends of the springs of a respective pair for bearing engagement with the wall of the opening of the outer drum, a plurality of pivotal clevis pins each swingably pinned to and projecting outwardly from the inner housing and swingably pinned to a respective shoe with the clevis pins normally urging the shoes outwardly toward the outer drum in the primary mode but allowing the freedom of continued rotation of the outer drum and wheel in the secondary mode when the driven member is unlocked from and overrides the driving member through the overcoming of the forces holding the shoes against the wall of the outer drum opening.

3,997,017
AUXILIARY HYDROSTATIC FRONT WHEEL DRIVE SYSTEM

John A. Campbell, Decatur; Joseph E. Dezelan, Joliet, both of Ill., and Cullen P. Hart, Chofu, Japan, assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Jan. 14, 1974, Ser. No. 432,969
Disclosure was also published under second Trial Voluntary Protest Program on Mar. 2, 1976
Int. Cl.² B60K *25/00*
U.S. Cl. 180—44 F **8 Claims**



1. In a vehicle having a fluid motor associated with a wheel thereof, a fluid pump and a fluid supply associated therewith, inlet conduit means connecting the pump and motor for supplying fluid under pressure from the pump to the motor, outlet conduit means extending from the motor and through which fluid flows from the motor, the fluid passing through the motor to drive the motor, and clutch means engageable upon application of fluid pressure thereto to effect a driving connection between the motor and wheel, and disengageable to disconnect the motor and wheel, the improvement which comprises means for applying the greater of the fluid pressures in the inlet and outlet conduit means to the clutch means for induc-

ing engagement thereof, and blocking the lesser of the fluid pressures in the inlet and outlet conduit means from the clutch means.

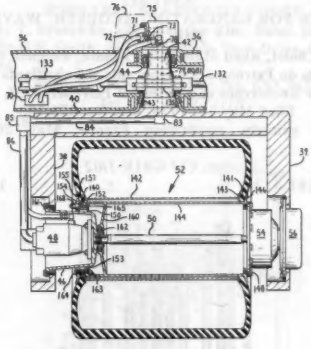
8. In a vehicle having a pair of wheels, a pair of fluid motors associated therewith, means for transmitting power from the motors to drive the wheels, a fluid pump and a fluid supply associated therewith, and fluid circuit means operatively connecting the pump and the motors, the improvement comprising control means operatively associated with the fluid circuit means comprising a first control valve shiftable into a first position, wherein the motors are connected with the pump to be driven in series thereby, and into a second position, said control means further comprising a second control valve shiftable to an actuated position wherein, with the first control valve in its second position, the motors are connected with the pump to be driven in parallel thereby, the second control valve being shiftable to a deactuated position, said parallel drive being provided only with the first control valve in its second position and the second control valve in its actuated position and further comprising means for shifting the first control valve to its second position and for shifting the second control valve to its actuated position, comprising fluid pressure operatively associated with the first and second control valves to so shift said control valves to their second and actuated positions respectively upon a certain level of fluid pressure being achieved, the level of said fluid pressure being determined by the speed of the vehicle.

3,997,018

DRIVE WHEEL ASSEMBLY WITH HIGH FLOTATION TIRE FOR COMPACTION VEHICLES

George D. Herbst, Milwaukie, Oreg., assignor to Hyster Company, Portland, Oreg.

Division of Ser. No. 217,916, Jan. 14, 1972, abandoned. This application Oct. 15, 1974, Ser. No. 514,418
Int. Cl.² B60K 9/00
U.S. Cl. 180—55 4 Claims



1. A drive wheel assembly for mounting a low-pressure, high flotation pneumatic tire on the drive wheel of a self-propelled compaction vehicle comprising:

spacer means extending within said tire between opposite ends thereof to maintain a fixed minimum distance between said opposite tire ends, said spacer means having opposite end surfaces engaging an inner surface portion of an opposed pair of annular tire beads at said opposite tire ends,

a hollow cylindrical wheel member extending the length of said tire within a central opening thereof, said wheel member having one flanged end engaging an outer surface portion of one of said beads, the opposite end of said wheel member terminating within the tire opening defined by the other of said beads,

planetary wheel drive means;

one end of said wheel member including means mounting said planetary wheel drive means externally thereof to close said one end, said planetary wheel drive means being detachable from said mounting means without disturbing the remainder of said wheel assembly,

wheel motor housing support means on said wheel member inwardly of the other wheel member end,

a wheel motor housing, attached to said support means and positioned outwardly thereof and having an axially outwardly directed opening for receiving a wheel motor,

a wheel motor within said wheel motor housing externally of said housing support means, said motor being detachable from said housing without removing said housing from the remainder of said wheel assembly,

means drivingly interconnecting said wheel motor and said planetary wheel drive means,

the other end of said wheel member having a central opening therethrough receiving said wheel motor housing,

wheel bearing means on said support means for rotatably interconnecting said wheel member and said wheel motor housing,

a cover plate for covering said opposite wheel member end and including a peripheral flange engaging an outer surface portion of said other tire bead,

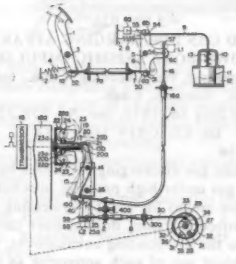
and take-up means acting between said cover plate and said opposite wheel member end in a manner such that by drawing said cover plate and said opposite wheel member end together said tire beads are compressed between said spacer end surfaces on the inside and said wheel member and cover plate flanges on the outside of said beads.

3,997,019

SPEED CONTROL DEVICE FOR CONTROLLING THE TRAVELLING SPEED OF A VEHICLE

Tetsuo Inoue, Hamamatsu, Japan, assignor to Yamaha Hatsudoki Kabushiki Kaisha, Japan

Filed Mar. 5, 1975, Ser. No. 555,454
Claims priority, application Japan, Mar. 6, 1974, 49-26062
Int. Cl.² B60K 41/20
U.S. Cl. 180—105 R 13 Claims



1. A speed control device for controlling the travelling speed of a wheeled vehicle including a rotating member rotated at a rate which is a function of the wheel speed of the vehicle, a throttle valve for adjusting the amount of suction air controlling the motor of the vehicle and a braking mechanism for braking the rotation of a wheel of the vehicle, comprising:

a centrifugal governor means coupled to said rotating member for generating a thrust corresponding to a centrifugal force generated by the rotation of the rotating member; and

a link mechanism for operatively connecting the centrifugal governor means to the throttle valve and to the braking mechanism so that the thrust of the governor means causes the throttle valve and the braking mechanism to be

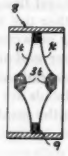
operated in a correlationship, said link mechanism including a lever assembly having first and second levers, one end of both said levers being coupled to the governor means so as to be substantially simultaneously forcedly moved by the thrust of the governor means, the other end portion of the first lever connected to the throttle valve and other end portion of the second lever being coupled to the braking mechanism, said levers each having a center pivoted portion pivoted at respective different pivot points, the lever ratio of the first lever for the throttle valve being greater than the lever ratio of the second lever for the braking mechanism.

3,997,020

SOUND ABSORBER

René-Guy Busnel, Vauboyen, 91 Bievre, France, and Hellmuth Etzold, 105A Central St., Narragansett, R.I. 02882

Filed Oct. 29, 1974, Ser. No. 519,003
Int. Cl.² E04B *1/99*
U.S. Cl. 181—33 G 6 Claims



1. A sound absorber comprising:
a block of rigid sound-reflecting material formed with a recess having walls defining a horn acting as acoustical impedance transformer and having a relatively wide mouth and a relatively narrow throat, the width of said mouth exceeding the distance between said mouth and said throat; and
a plug of sound-absorbing material of matched acoustical impedance at said throat.

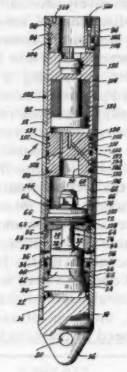
3,997,021

PRESSURIZED GAS DISCHARGING APPARATUS FOR USE AS A DOWN-BORE SEISMIC IMPULSE SOURCE

Stephen V. Chelminski, West Redding, Conn., assignor to Bolt Associates, Inc., Norwalk, Conn.

Filed May 16, 1975, Ser. No. 578,329
Int. Cl.² G01V *1/40, 1/14*
U.S. Cl. 181—106 16 Claims

1. In pressurized gas discharging apparatus having a chamber for holding gas under high pressure, discharge ports and actuatable release means for abruptly releasing powerful impulses of pressurized gas from the chamber through the discharge ports into the surrounding environment, the invention enabling convenient use of such apparatus as a seismic impulse source within a narrow borehole in the earth and providing a compact apparatus having an efficient stacked assembly of components in a unitary tubular shell comprising:
an elongated unitary tubular shell,
a plurality of removable components within said tubular shell, including partition means removably positioned within the tubular shell dividing the interior thereof into a first chamber and a second chamber,
said tubular shell having a plurality of openings therein in the region of the second chamber defining discharge ports communicating with the second chamber and with the exterior of said shell,
release means positioned within and movable in the second chamber providing sudden release of pressurized gas through the discharge ports upon actuation of the release means,
a seal assembly removably positioned within said tubular shell and adapted to be engaged by said release means,
gas flow passageway means connecting the first and second chambers providing communication therebetween,
said tubular shell having a pressurized gas supply passageway located within a wall portion thereof and communicating with said first chamber for supplying high pressure gas to the first chamber from an external supply of pressurized gas,
a removable end closure removably secured at one end of said tubular shell for holding the removable components therein.

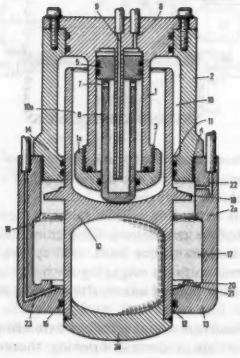


3,997,022

DEVICE FOR GENERATING ACOUSTIC WAVES BY IMPLOSION

Jacques Cholet, Rueil Malmaison, France, assignor to Institut Francais du Petrole, des Carburants et Lubrifiants et Entreprise de Recherches et d'Activities Petrolieres Elf, France

Filed May 16, 1975, Ser. No. 578,183
Claims priority, application France, May 20, 1974, 74.17775
Int. Cl.² G01V *1/02*
U.S. Cl. 181—120 17 Claims



1. A device for generating acoustic waves in a fluid medium by implosion comprising a cylinder; a piston having a wall in contact with the fluid medium and adapted to slide in said cylinder between a first inner position in said cylinder and a

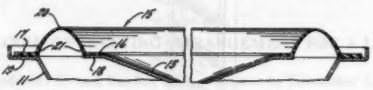
second outer position in said cylinder, said piston permanently sealing the inside of said cylinder from said fluid medium; a movable member intermittently abutting against said piston for driving the same in only a first direction; means for successively driving said movable member in said first direction such that said piston is moved toward said second position, and driving said movable member in an opposite direction toward said first position; releasable means for releasably locking said piston in said second position; and means for abruptly returning said piston to said first position.

3,997,023

LOUDSPEAKER WITH IMPROVED SURROUND

Stanley F. White, P.O. Box 86, Roselle, Ill. 60172

Filed Dec. 10, 1975, Ser. No. 639,306
Int. Cl.² G10K *13/00*; H04R *7/00*
U.S. Cl. 181—171 19 Claims



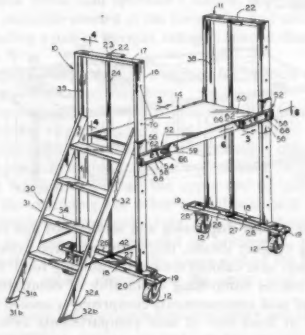
1. A loudspeaker comprising the combination of a frame, a cone assembly which includes a cone body having an outer periphery spaced away from said frame, and a flexible annular surround connecting the periphery of the cone body to the frame, said surround having an inner peripheral flange secured to the outer periphery of the cone body, an outer peripheral flange secured to the frame, and an arched web between the two flanges and spanning the gap between the cone body and the frame, the radial cross-section of said arched web having a varying radius of curvature with a greater radius at the bases thereof than an the apex.

3,997,024

PORTABLE SCAFFOLD LADDER

Anthony T. Fredricks, 1932 Sunrise Rim, Boise, Idaho 83705, and Paul F. Smith, 4621 Mountain View Drive, Boise, Idaho 83704

Filed Nov. 19, 1975, Ser. No. 633,363
Int. Cl.² E04G *1/18*
U.S. Cl. 182—17 12 Claims



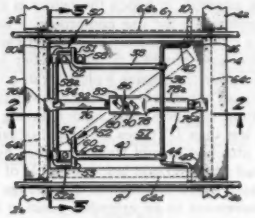
1. A portable collapsible scaffold comprising:
a pair of horizontally opposed and spaced-apart wheel-mounted upright end members,
a platform member extending when operative horizontally between said upright end members,
connector means for joining the opposite ends of said platform member to said upright end members and for adjusting the height of said platform member along said end members,
said connector means comprising a glide member having a pivot portion extending along one side of said platform member and pivoted thereto to enable relative pivoting movement between said glide member and said platform member in a plane of said end members and a glide portion extending at right angles to said pivot portion along a corresponding side of an adjacent side end member and adapted for sliding movement therealong, said glide and pivot portions being rigidly interconnected,
and interlock means carried by said glide member for interlocking said end members and said platform member at right angles to one another at selected positions along said end members.

3,997,025

ACCESS DOOR AND LADDER STRUCTURE FOR SILO

Raymond R. Price, Rochester, Minn., assignor to Rochester Silo, Inc., Rochester, Minn.

Filed Sept. 4, 1975, Ser. No. 610,453
Int. Cl.² E05D *15/50*
U.S. Cl. 182—77 16 Claims



1. A silo door structure comprising:
a door frame comprising a pair of laterally spaced, vertical members and a pair of vertically spaced, top and bottom sill beams extending therebetween and cooperating therewith to form a door opening;
a vertically extending aperture on one side of each of said sill beams;
a ladder rung and door hinge assembly comprising a pair of laterally spaced, upright bars and a pair of vertically spaced, generally horizontal ladder rungs extending therebetween;
a pair of generally horizontal, offset segments on the top and bottom ends of one of said upright bars, said offset segments terminating at their outer ends in a pair of hinge pin extensions projecting vertically upwardly and downwardly therefrom and pivotally received within said apertures in said sill beams, the bottom one of said offset segments having at least a portion thereof normally resting on the bottom door sill beam, whereby the downward force of a person's weight acting on said ladder rungs will be transmitted through said upright bars to said bottom sill beam;
a door affixed to said ladder rung and door hinge assembly and pivotal therewith on said hinge pin extensions between open and closed positions with respect to said door opening; and
means for securing said door and ladder rung assembly in said closed position.

3,997,026

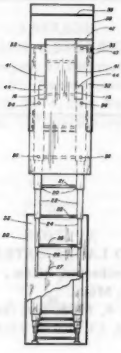
COLLAPSIBLE LADDER ASSEMBLY SUITABLE FOR USE AS FIRE ESCAPE

Joseph F. Riehlmann, 5862 Fleur de Lis Drive, New Orleans, La. 70100

Continuation-in-part of Ser. No. 427,012, Dec. 13, 1973, Pat. No. 3,946,833. This application Apr. 11, 1975, Ser. No. 567,133

Int. Cl.² E06C 9/06

U.S. Cl. 182—96 8 Claims



1. A ladder assembly in which the ladder is collapsible for storage and extensible for use comprising a box-like frame member and a collapsible ladder; said ladder capable of being enclosed within said box-like frame member in the storage position; said ladder comprising a plurality of telescoping stile pairs including an upper stile pair and a lower stile pair and a plurality of rung members, said ladder having an extended length of not less than 1.3 times the height of said frame; said ladder being attached to said frame member by at least two pairs of pivoted arms and said ladder capable of being accommodated in said frame member in the storage position and capable of movement to an extended position in which said upper pair of stile members moves outwardly and downwardly on said pivoted arms to a predetermined vertical position sufficient to allow passage of a person between said frame and said ladder; said ladder being secured in the extended position by tension means connecting between said ladder and frame member; and said ladder assembly including a cover panel attached to said upper stile pair which cover panel substantially closes the outside opening in said box-like frame member.

3,997,027

LADDER

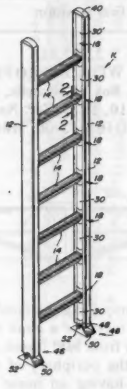
Allen S. Patterson, 19151 S. Lake Shore Blvd., Euclid, Ohio 44119, and Emanuel M. Trikilis, P.O. Box 116, Brunswick, Ohio 44212

Filed Nov. 4, 1974, Ser. No. 520,456

Int. Cl.² E06C 7/08, 1/08

U.S. Cl. 182—195 9 Claims

1. A ladder or the like comprising; an elongated rail having opposite end portions and an outwardly opening longitudinal groove therein, said groove having an outer width W and an inner width W_1, which is greater then W, a plurality of one-piece longitudinally-spaced connector members having first end portions longitudinally slidably positioned in said groove against movement in any direction except longitudinally relative to said rail, each said connector member having a connecting end portion integral with said first end portion and extending outwardly from said groove generally perpendicular to said rail, an elongated rung connected to each said connecting end portion and extending generally perpendicular to said rail, each said rung having an open end receiving said connecting end portion on one of said connector members and being secured thereto against movement in any direction, spacer means longitudinally slidably positioned in said groove and longitudinally filling said groove between said connector members to maintain said connector members longitudinally



spaced-apart, said connector members and spacer means substantially filling said groove longitudinally between said opposite end portions of said rail, and means adjacent said end portions of said rail for preventing said connector members and spacer means from sliding longitudinally out of said groove and thereby preventing longitudinal sliding movement of said connector members and spacer means relative to said rail.

3,997,028

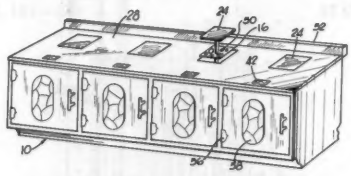
ENTERTAINMENT TABLE

Euphemia Lopez, Pacifica, Calif., assignor to Lawrence Peska Associates, Inc., New York, N.Y., a part interest

Filed June 23, 1975, Ser. No. 589,789

Int. Cl.² E04H 3/04

U.S. Cl. 186—1 R 1 Claim



1. Apparatus for dispensing and serving hot and cold foods comprising cabinet means, thermally insulated compartment means within said cabinet means for holding food, said compartment means comprising a plurality of compartments, at least one of said compartments comprising a cooled compartment and at least one of said compartments comprising a heated compartment, heat pump means connected to heat exchange means in said cooled compartment and heat exchange means in said heated compartment for pumping heat from said cooled compartment into said heated compartment, first door means mounted in the front of said cabinet means for access to said compartment means, shelf means in said compartment means for holding food, said shelf means being accessible through said first door means, elevator means in said compartment means for raising and lowering food out of and into said compartment means, said elevator means com-

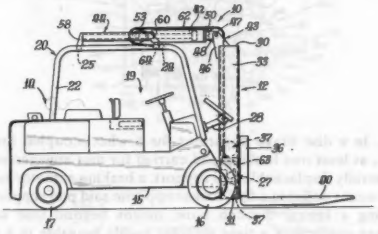
prising tray means for holding food, said tray means being mounted on telescoping vertical means, means for raising and lowering said telescoping means, second door means in combination with said elevator means for opening and closing said cabinet means through the top thereof when said elevator means is raised to present food for dispensing and serving and lowered to store food for subsequent use, said second door means positioned over and operatively connected to said tray means by means for opening said second door means when said tray means is moved upward and closing said second door means when said tray means is moved downward, said tray means being movable in an upward direction to at least the level of the top of said cabinet means.

3,997,029

CARRIAGE HOISTING ARRANGEMENT FOR A LIFT TRUCK

Dafydd W. Evans, Euclid, Ohio, assignor to Towmotor Corporation, Mentor, Ohio

Filed Sept. 8, 1975, Ser. No. 611,296
Int. Cl.² B66F *9/06*
U.S. Cl. 187—9 R **2 Claims**



1. A hoisting arrangement for a lift truck having a chassis with a forwarding facing operator's station carried thereon and an operator protective structure disposed in overhead protective relation above said operator's station, comprising;

a mast assembly carried at the forward end of said truck and including a pair of upright, laterally spaced channel members;

a load supporting carriage mounted for vertical movement along said channel members;

jack supporting track means mounted atop said operator protective structure;

extensible and retractable jack means having opposite ends;

means pivotally mounting one end of said jack means in fixed relation relative to the upper end of said lift mast;

means for mounting the other end of said jack means for longitudinal movement along said track means so that said jack means is disposed in horizontal, rearwardly extending relation from the upper end of the lift mast;

first sheave means mounted at the upper end of said lift mast;

second sheave means carried on said other end of said jack means; and

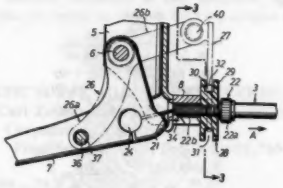
elongated chain means having one end thereof anchored to said load carriage and extending upwardly therefrom around said first sheave means, then rearwardly therefrom around said second sheave means and having its other end anchored relative to said jack supporting track means so that the extension of said jack means is effective in raising said load carriage while said jack means is positioned to permit greater visibility through said mast assembly.

3,997,030

AUTOMATIC BRAKE ADJUSTING DEVICE FOR BICYCLES

Kiyokazu Yoshigai, Osaka, Japan, assignor to Yoshigai Kikai Kinzoku Co., Ltd., Osaka, Japan

Filed Apr. 30, 1975, Ser. No. 573,167
Claims priority, application Japan, Nov. 28, 1974, 49-138038
Int. Cl.² B62L *3/02*
U.S. Cl. 188—24 **15 Claims**



1. An automatic brake adjusting device for use with a bicycle brake system comprising brake operating means including a housing secured to a handlebar, and a brake operating lever grippably secured to said housing; brake means for braking the associated bicycle wheel; and a Bowden cable for transmitting the gripping force on said brake operating lever in a direction in which the brake means acts to apply the brakes, said Bowden cable including an inner cable portion and an outer sheath portion which operatively interconnects said brake means and said brake operating means, said device being chracterized in the use of an automatic brake adjusting means for bicycles comprising a transmission member operatively connected to said operating lever, an adjusting screw member adapted to be turned through the intermediary of said transmission member, and an outer sheath receiver screwed into said adjusting screw member being installed in the brake operating means, the arrangement being such that when the gripping depth of the brake operating lever is increased, the adjusting screw member is turned to cause the outer receiver screwed thereinto to be automatically moved in the brake applying direction.

3,997,031

BRAKES

Hermann Klaue, Tour d'Ivoire 24 e, 1820 Montreux, Switzerland

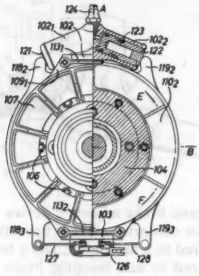
Division of Ser. No. 457,261, April 2, 1974, Pat. No. 3,942,610, which is a division of Ser. No. 288,287, Sept. 12, 1972, Pat. No. 3,885,650, which is a continuation-in-part of Ser. No. 73,566, Sept. 18, 1970, abandoned. This application Dec. 12, 1975, Ser. No. 640,164
Claims priority, application Germany, Dec. 2, 1969, 1960286; Dec. 27, 1969, 1965171; Dec. 27, 1969, 1965170
Int. Cl.³ F16D *55/10*
U.S. Cl. 188—71.4 **2 Claims**

1. In a brake assembly comprising

a brake housing comprising an annular member having an annular gap of channel-like cross-section open on its radially exterior side, the opposite inner sides of said channel-like gap providing annular braking surfaces, said brake housing being attachable to be rotatably jointly with a wheel of an assembly to be braked;

at least one pair of segmental brake shoes disposed from the radially exterior side into the channel-like gap having friction faces facing the adjacent braking surfaces, means for moving said brake shoes into contact with said braking surfaces and means for non-rotatably supporting each pair of brake shoes in the gap comprising a fixed support means which carries members disposed over the gap and removable from over said gap to uncover a portion of the gap whereby the brake shoes are insertable into the gap

without dismantling the brake shoe moving means, the improvement wherein said fixed support means is a bracket and said means for moving the brake shoes into contact with the said braking surfaces comprises two actuating rings and balls disposed between the actuating rings and within ramps formed in the actuating rings, thrust rings arranged between said actuating rings and the brake shoes and a plurality of ball bearings disposed between the thrust rings and the adjacent actuating ring at the radially inner and the radially outer circumferences



of said rings, a lug on each actuating ring, a cylinder unit comprising two opposed cylinders mounted on the fixed bracket, a piston slidably disposed in each cylinder, an inlet for introducing hydraulic fluid into each cylinder means for supplying hydraulic fluid to the said inlet, each piston having one end facing the inlet and an opposite end bearing against a lug on an actuating ring, whereby when hydraulic fluid under pressure enters the cylinder unit, the pistons move outwardly in opposite directions and the actuating rings are angularly rotated in opposite directions.

3,997,032

DISK BRAKE ASSEMBLY FOR USE IN MOTORCYCLES

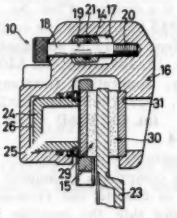
Toshio Kondo, Chiryu, Japan, assignor to Aisin Seiki Kabushiki Kaisha, Japan

Filed July 1, 1975, Ser. No. 592,161

Claims priority, application Japan, July 19, 1974, 49-86629[U]

Int. Cl.² F16D 55/18

U.S. Cl. 188—72.4 6 Claims



1. A disk brake assembly associated with a rotatable brake disk of a motorcycle, comprising in combination:

a stationary yoke member fixedly mounted on the motorcycle and including an arm and a stem;

a housing straddling said brake disk of said motorcycle and provided with an elongated hole therein in which said arm of said stationary yoke extends;

bolt means secured to said housing and traversing said elongated hole at substantially right angles thereto, said bolt means being slidably received by said arm of said yoke member;

a piston slidably fitted within said housing;

one brake pad mounted on said stem of said yoke member and being disposed between said piston and said rotatable brake disk;

another brake pad mounted on said housing and being disposed opposite of said one brake pad relative to said rotatable brake disk; and

a rubber cover secured to said yoke and said housing for closing the opening of said elongated hole between the housing and the arm therewithin to prevent foreign matter from entering therein;

whereby braking torque generated on said one brake pad is received by said stem while braking torque generated on said other brake pad is received by said yoke member through said housing and said bolt means.

3,997,033

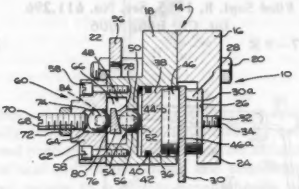
CAM OPERATED DISC BRAKE

Lloyd Bulmer, Long Beach, Calif., assignor to Airheart Products, Inc., Chatsworth, Calif.

Filed Jan. 2, 1975, Ser. No. 537,839

Int. Cl.² F16D 55/224

U.S. Cl. 188—72.7 16 Claims



1. In a disc brake apparatus for a wheel-coupled braking disc, at least one braking pad carried for disc engagement on a laterally displaceable pad support, a braking actuator including means defining a first socket opposite said pad support and having a lateral through bore, means beyond said socket means comprising a rigid member bodily movable in a plane generally parallel to said disc, said member having a laterally facing shoulder opposite said pad support and sloped relative thereto in the direction of member movement, and follower structure comprising follower ball means rotatable and laterally displaceable in said socket through bore, said socket limiting lateral follower ball means displacement to such displacement along the longitudinal axis of the pad support, whereby the follower ball means surface defines a traveling locus of tangential engagement with said shoulder, said follower ball means acting on said pad support in axial displacing relation responsive to progressive member bodily movement in said plane, there being a second socket at the lateral side of said rigid member opposite said first socket, said sockets being integrally connected, and a second ball retained in said second socket against lateral and longitudinal bodily movement relative to said sockets during said member bodily movement, said second ball engaged with the opposite lateral side of said member.

3,997,034

DISC BRAKE SLIDING CALIPER MOUNTING

George Edward Kellogg, Bougival, France, assignor to General Motors Corporation, Detroit, Mich.

Filed Mar. 27, 1975, Ser. No. 562,850

Claims priority, application United Kingdom, Mar. 28, 1974, 13743/74

Int. Cl.² F16D 55/224

U.S. Cl. 188—73.3 1 Claim

1. A disc brake assembly comprising:

a rotary disc;

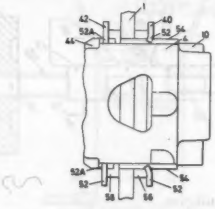
a non-rotary carrier having two spaced apart threaded aper-

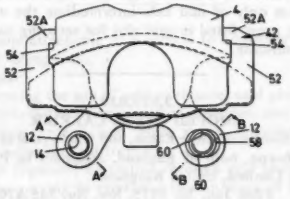
tures therein extending axially parallel to the axis of rotation of said disc;

a pair of spaced apart pins, each pin having a threaded end portion threadedly engaged in one of said apertures to secure said pins to said non-rotary carrier, each pin having a portion extending from said non-rotary carrier in a direction away from a side surface of said disc and parallel to said axis of rotation of said disc and lying within the projected circumference of said disc, one of said pins having intermediate its length a circumferential groove formed therein;

a resilient ring accommodated in said groove and extending radially of said pin from said groove; a caliper having a body including a spaced pair of limbs interconnected by a bridge portion with one limb defining a cylinder connectible to a source of pressure fluid, guide surfaces including ledges at each side of said bridge portion between said limbs, and two lugs one on each side of said cylinder, each lug having a through aperture formed therethrough, each aperture slidably receiving one of said pins whereby said caliper is slidably mounted to said non-rotary carrier;

a piston slidably mounted within said cylinder and co-acting therewith to define brake actuating means;





two brake pads of one pattern carried by said caliper, one pad adjacent said side surface of said disc, and the other pad adjacent a side surface of said disc opposite the said side surface, each of said brake pads including a backing plate and a lining segment;

each of said backing plates having ears arranged to rest on said ledges with the space between said ears being dimensioned such that when said ears are within the surface planes of their respective backing plate said ears clinch tightly to said caliper bridge portion, the ears of one of said brake pads being bent out of the planes of its backing plate surfaces to permit said one brake pad to slide on said ledges, the ears of the other of said brake pads clinching tightly to said caliper bridge portion adjacent one limb with the backing plate thereof in brake applying force engagement with said one limb, said arrangement permitting the use of one brake pad pattern for both brake pads;

actuation of said brake actuating means being effective to move directly one of said pads into braking engagement with the side surface of the disc adjacent said pad and by reaction to effect sliding of said caliper on said pins to apply said other pad to the adjacent side surface of the disc, sliding of said caliper during braking actuation deforming said resilient ring and by said deformation providing a return force for said caliper upon cessation of brake actuation;

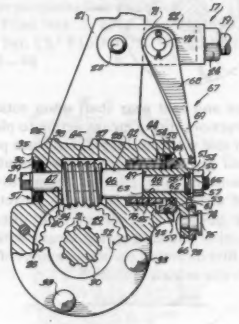
said pin having the resilient ring thereon having a circular cross-section, the aperture in said lug in which said pin is received being so formed as to have a complementary circular cross-section, said other pin being received in its respective aperture in said other lug and said aperture being defined so as to have two opposed flats in a substantially circular boundary of said aperture, against which flats the pin bears to absorb braking torque reaction.

3,997,035

AUTOMATIC SLACK ADJUSTER FOR VEHICLE BRAKES

Reinhold Carl Zeidler, Birmingham, Mich., assignor to Borg-Warner Corporation, Chicago, Ill.

Filed Sept. 2, 1975, Ser. No. 609,769
Int. Cl.² F16D *65/56*
U.S. Cl. 188—79.5 K **25 Claims**



1. An automatic slack adjuster for a vehicle brake system of the type comprising a braking member and a cam shaft operatively connected thereto for rotation about its axis of rotation by said member to oscillate a cam member; said slack adjuster comprising a first gear mounted in said braking member and nonrotatably mounted on said cam shaft to form an angularly adjustable connection between said braking member and said cam shaft; a gear shaft in said braking member and carrying a second gear engaging with said first gear for angular adjustment thereof; means frictionally engaging said gear shaft; an actuator mounted on said gear shaft and rotatable relative thereto; a one-way clutch operatively connecting said actuator and said gear shaft upon rotation of the actuation in a first direction; spring means encompassing said gear shaft and acting to place a predetermined torque on said actuator; said gear shaft, second gear, friction means, actuator, one-way clutch and spring means positioned in concentric relationship; and means for rotating said actuator in a second direction in response to movement of said braking member in a brake applying direction with said spring means effective to rotate said actuator in the first direction in response to movement of said braking member in a brake releasing direction.

3,997,036

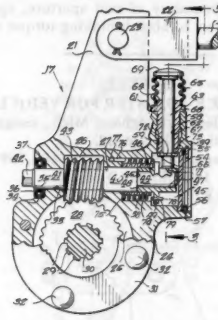
AUTOMATIC BRAKE SLACK ADJUSTER

Reinhold Carl Zeidler, Birmingham, Mich., assignor to Borg-Warner Corporation, Chicago, Ill.

Filed Sept. 9, 1975, Ser. No. 611,746
Int. Cl.² F16D *65/56*
U.S. Cl. 188—79.5 K **37 Claims**

1. An automatic slack adjuster for a vehicle brake system of the type comprising a braking member and a cam shaft opera-

tively connected together for rotation about its axis of rotation by said member to oscillate a cam member; said slack adjuster comprising a first gear mounted in said braking member and non-rotatably mounted on said shaft to form an angularly adjustable connection between said braking member and said cam shaft; a gear shaft in said braking member and carrying a second gear in operative engagement with said first gear for angular adjustment thereof; a rotor mounted on said gear shaft to rotate relative thereto; a one-way clutch operatively con-



necting said rotor and said gear shaft upon rotation of said rotor in a first direction; spring means acting to place a predetermined load on said rotor in the brake release position; said gear shaft, second gear, rotor and one-way clutch being in concentric relationship; and plunger means to rotate said rotor in a second direction in response to movement of said braking member beyond a predetermined distance in the brake apply direction and said spring means acting to rotate said rotor in the first direction upon movement of the braking member in the brake release direction.

3,997,037

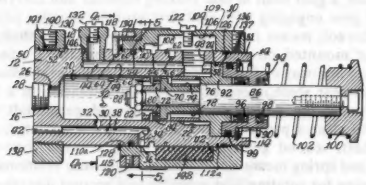
ADJUSTABLE SHOCK ABSORBER

Willard J. Schupner, Palatine, Ill., assignor to Efdyn Corporation, Chicago, Ill.

Filed Aug. 5, 1975, Ser. No. 601,977

Int. Cl.² F16F 9/48

U.S. Cl. 188—315 **7 Claims**



1. A shock absorber comprising an elongated housing with a forward end and a rearward end and an outer axial surface, said housing defining an axial primary chamber therein, a piston assembly axially movable within said primary chamber and presenting forward and rearward sides, a piston rod connected to said piston assembly and extending from said forward side thereof outwardly of said forward end of said housing for receiving impact forces, said housing including a plurality of circumferentially spaced apart metering passageways in the wall thereof each of which at its one end is open to said primary chamber on the rearward side of said piston assembly when the latter is in a normal rest position and each of which at its other end defines an orifice open at said outer surface of said housing, each of said metering passageways comprising a radial bore at said one end, a radial bore at said other end, and an axial bore therebetween, a flow control member mounted on said outer surface of said housing and defining with said housing an accumulator chamber for communication with said orifices and having a valve portion associated with said orifices for establishing the effective area thereof, the position of said flow control member and said valve portion thereof being adjustable to vary the effective area of said orifices whereby to regulate the flow of fluid outwardly of said primary chamber through said metering passageways to said accumulator chamber as said piston assembly moves rearwardly in said primary chamber, being cylindrical and said outer surface being threaded at the opposite ends thereof, said flow control member being an annular sleeve member having internal threads at one end thereof, and said sleeve member being adjustably threaded on one end of said housing.

3,997,038

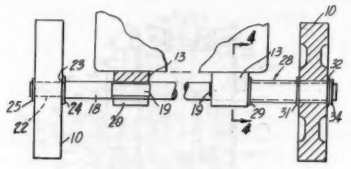
WHEELED SUITCASE

Brooks Walker, 807 Francisco St., San Francisco, Calif. 94109

Filed June 23, 1975, Ser. No. 589,073

Int. Cl.² A45C 5/14

U.S. Cl. 190—18 A **4 Claims**



1. In a wheeled suitcase,

a mount fixedly secured to one side of said suitcase,

said mount being formed with a downwardly opening slot,

an axle, and a wheel rotatably mounted at one end thereof,

a portion only of said axle intermediate the ends thereof being press fitted in said slot for securing said wheel to said suitcase.

3,997,039

LOOPED CABLE CARRIER

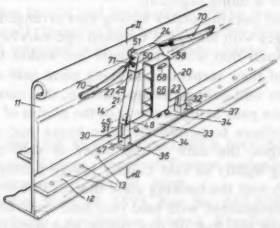
Terrence Hubbard, Little Eaton, and Gladwyn Raymond Hunt, Oakerthorpe, both of England, assignors to Perard Engineering Limited, United Kingdom

Filed Jan. 30, 1975, Ser. No. 545,470

Claims priority, application United Kingdom, Jan. 31, 1974, 4513/74; Mar. 29, 1974, 13927/74

Int. Cl.² B65H 57/02

U.S. Cl. 191—12 R **12 Claims**



1. A carrier for a looped cable used to supply power or water to a winning machine which traverses along a mineral face, which carrier comprises a body, a gate mounted on the body for angular movement relative to the body between open and closed positions, mounting means adapted for mounting the carrier on a horizontal surface whereby the body is sup-

ported above that surface, the gate in its closed position projecting, in use, parallel to said horizontal surface, wherein the improvement resides in at least two elongate spaced blocks of resilient material each connected to and extending longitudinally between the body and said mounting means, so as flexibly to support the body.

3,997,040

TRANSMISSION CONTROL CONSOLE WITH RECESSED BRAKE LEVER

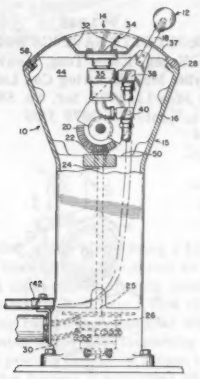
Frederick C. O'Neill, and Alfred W. Sieving, both of Macon County, Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Dec. 10, 1974, Ser. No. 531,267

Disclosure was also published under second Trial Voluntary Protest Program on Feb. 24, 1976

Int. Cl.² B60K *29/02*

U.S. Cl. 192—4 A **6 Claims**



1. A console attachable to a vehicle to control a transmission thereof; comprising:

an enclosure;

a plate forming the top of said enclosure, said plate including an indentation forming a trough therein and including a channel through said plate in an upraised portion thereof adjacent said trough;

a gearshift regulator extending through said channel, said regulator serving to control a transmission of a vehicle; and

a parking brake actuator recessed within said trough, said actuator serving to control a parking brake of said vehicle.

3,997,041

ONE-WAY CLUTCH

Carl R. Judd, and Howard D. Snyder, both of Ithaca, N.Y., assignors to Borg-Warner Corporation, Chicago, Ill.

Filed Sept. 19, 1975, Ser. No. 615,000

Int. Cl.² F16D *41/07, 43/24*

U.S. Cl. 192—41 A **4 Claims**

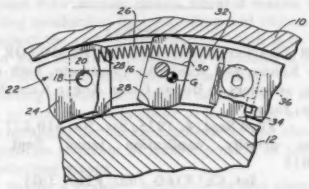
1. A one-way clutch comprising:

an outer race and an inner race;

tiltable sprags between said races carried by a cage means, each sprag being tiltable about an axis offset from the center of gravity thereof and having radially inner and outer race engaging and clamping surfaces;

garter spring means positioned radially outwardly of said axis and center of gravity tending to rotate or pivot said sprags into race engaging position; and

wherein upon overrunning of the outer race said sprags rock away from contact with the outer race because of the viscous shear of lubricant to remain until the inner race rotates in the same direction as the outer race when



centrifugal force acting on the sprags rotates them into engagement with both races.

3,997,042

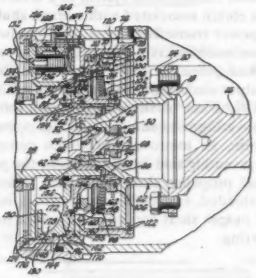
AIRCRAFT ENGINE COUPLING

Stephen Langham, Indianapolis, Ind., assignor to General Motors Corporation, Detroit, Mich.

Filed Nov. 5, 1975, Ser. No. 629,074

Int. Cl.² F16D *43/20, 41/00, 43/284*

U.S. Cl. 192—46 **3 Claims**



1. A coupling assembly for separation of a propeller and reduction gear box from an engine drive shaft in response to a high negative propeller torque comprising: a first coupling member adapted to be connected to the engine drive shaft, a second coupling member adapted to be connected to the input to a reduction gear box for a propeller, an intermediate coupling member axially movable with respect to said first and said second coupling members, means for coupling said first and intermediate coupling members to permit axial movement therebetween while restraining relative rotation therebetween, torque responsive means for coupling said intermediate coupling member to said second coupling member to permit a controlled separation of said second and intermediate coupling members in response to a predetermined negative torque being applied to said second coupling member, said torque responsive means including a helical spline on both of said second and intermediate coupling members, means for preventing ratcheting of said helical splines upon separation of said second and intermediate coupling members, said last mentioned means including a single fluid piston having an abutment engageable with said intermediate coupling member to define an axial reference surface for maintaining a drive couple between said first, second and intermediate coupling members under normal operation, said last mentioned means further including means for applying a hydraulic pressure differential across said single fluid piston to apply a force on said intermediate coupling member in response to axial movement of said intermediate coupling member from a coupled relationship with said third coupling member wherein said helical splines thereon are maintained in a completely

decoupled, non-ratchet position when said second and intermediate coupling members are separated from one another to disconnect the propeller gear box from the engine drive shaft.

3,997,043

POWER TRANSMISSION DEVICE IN MOTOR VEHICLE

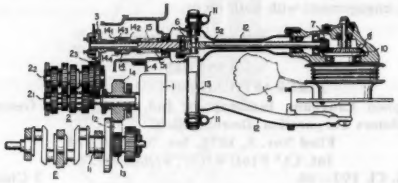
Makoto Kondo, and Kuniyuki Yamamoto, both of Saitama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Sept. 4, 1975, Ser. No. 610,227

Claims priority, application Japan, Sept. 5, 1974, 49-107015

Int. Cl.[2] F16D *7/00*; F16H *3/08*

U.S. Cl. 192—55 3 Claims



1. In a power transmission system in a motor vehicle which comprises: a clutch associated with a crank shaft of an engine, a group of power transmission gears, an output shaft for said power transmission gears, a driving gear mounted on said output shaft, a propeller shaft, a universal joint for joining both said output shaft and said propeller shaft at their respective end parts, a set of final speed reduction gears, and a protective covering to accommodate said power transmission system therein, an improvement which comprises a buffer means for preventing said output shaft for the power transmission and said propeller shaft connected therewith from becoming overloaded, said buffer means being mounted on one part of said output shaft and covered with a part of said protective covering.

3,997,044

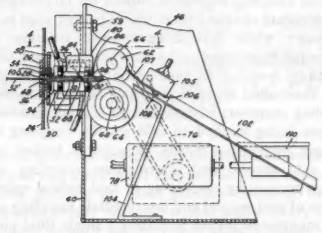
AUTOMATIC TICKET CHUTE

Donald S. Schasser, Pinckney, Mich., assignor to Automatic Parking Devices, Inc., Farmington, Mich.

Filed Apr. 24, 1975, Ser. No. 571,422

Int. Cl.[2] G07F *7/08*

U.S. Cl. 194—4 C 2 Claims



1. An automatic ticket chute comprising a ticket throat having an entrance to receive a ticket, means responsive to insertion of a ticket into said throat to develop a drive signal, drive means disposed adjacent said throat remotely of said throat entrance and responsive to said drive signal to pull the ticket through said throat, chute means having an entrance disposed adjacent said drive means remotely of said throat entrance to receive a ticket upon activation of said drive means, means disposed at said chute entrance activated by a ticket passing into said chute, and means responsive to said ticket-activated means to terminate said drive signal; said insertion responsive means comprising first switch means having a normally open circuit condition and being activated to a closed circuit condition upon insertion of said ticket into said throat, first relay coil means connected in series with said first switch means across a source of electrical power and first contact means operatively associated with said first relay coil means to develop said drive signal when said first relay coil is energized; said drive signal terminating means comprising charge storage means storing a preselected charge upon activation of said second switch means, second relay coil means energized upon deactivation of said switch means for a preselected time proportional to said preselected charge, and second contact means connected in series with said first relay coil means and operatively associated with said second relay coil means to de-energize said first relay coil means when said second relay coil is energized.

3,997,045

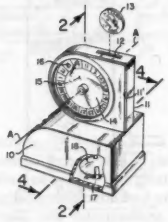
ROULETTE SAVINGS BOX

Yim Hei Joseph Yeung, Kwun Tong, Kowloon, Hong Kong, assignor to Joylite Manufacturing Co., Ltd., Hong Kong

Filed June 13, 1975, Ser. No. 586,667

Int. Cl.[2] G07F *5/00*

U.S. Cl. 194—94 1 Claim



1. A roulette savings box comprising, in combination:

a. a base housing having an upper passage for receiving coins;

b. a coin shute structure integrally formed on the top of said base housing over said upper passage, the upper end of said shute structure having a coin receiving slot, the back being closed by an integral rear wall and the front of said coin shute structure having a window;

c. a disc in a vertical plane in said coin shute structure between said window and rear wall;

d. a bearing needle axially secured in the center of said disc, said window and rear wall having small conical cavities at their central portions receiving opposite ends of said bearing needle to thereby rotatably mount said disc with its axis of rotation normal to the plane of said window and spaced off-center of said coin receiving slot, the front base of said disc having symbols adjacent to its peripheral edge over 360° similar to a roulette wheel and all being visible through said window, the rear face of said disc having a plurality of radially extending vanes curving upwardly toward said coin receiving slot as they successively pass under said coin receiving slot, the bottom of said base housing including a cut-out defining an annular lip; and,

e. a closure member having projections to overlie opposite portions of said lip when rotated to a given position, said lip having opposite slots through which the projections pass to thereby provide access to the interior of said housing, whereby whenever a coin is dropped through said coin receiving slot, it will strike one of said vanes to thereby rotate said disc, said coin then passing through said upper passage into said base housing and said disc eventually coming to rest in a random position, coins

collected in said housing being retrievable by removing said closure member.

3,997,046

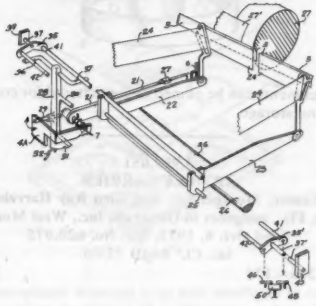
FLEXIBLE CORRECTION AUXILIARIES FOR USE WITH GOLF-BALL TYPEWRITERS

William H. Wolowitz, 6905 Persimmon Tree Road, Bethesda, Md. 20034

Continuation of Ser. No. 396,676, Sept. 13, 1973, abandoned. This application Apr. 8, 1975, Ser. No. 566,638

Int. Cl.² B41J *35/23, 35/28*

U.S. Cl. 197—181 7 Claims



6. In a typewriter of the kind having a keyboard, a carrier translatable in a linewise direction across an impression sheet, a single element character imprinting member mounted on said carrier, first means including a first ribbon vibrator for feeding a marking ribbon between said imprinting member and said impression sheet and for raising said first ribbon vibrator during a printing operation, means including a second ribbon vibrator for feeding a correcting ribbon between the printing ribbon and the impression sheet,

the improvement comprising:

control means selectively operable when an error is to be obliterated to connect said second ribbon vibrator to a part of said first means that moves only when the first ribbon vibrator moves so that said first means will raise the second ribbon vibrator along with the first vibrator

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3,997,047

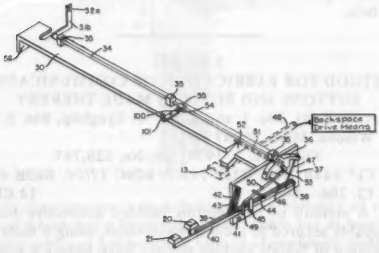
ATTACHMENT FOR CONVERTING A STANDARD TYPEWRITER INTO A CORRECTING TYPEWRITER

William H. Wolowitz, 6905 Persimmon Tree Road, Bethesda, Md. 20034

Filed Dec. 27, 1974, Ser. No. 537,027

Int. Cl.² B41J *29/16*

U.S. Cl. 197—181 10 Claims



1. An attachment for a typewriter of the type having backspace drive means; a keyboard having a plurality of keys, including a backspace key, with keylevers for said keys that extend rearwardly thereof, said backspace keylever operating the backspace drive means; ribbon vibrator means; a ribbon field selecting mechanism for controlling said ribbon vibrator means to select the ribbon field thereof which is to be used, said ribbon field selecting mechanism including a manually operated element; said attachment comprising:

a. a mounting element adapted to be secured to said typewriter so that it extends above at least some of said keylevers including the backspace keylever and also extends to a position adjacent at least a portion of said ribbon field selecting means,

b. a key having a keylever supported by said element,

c. means carried by said element, to depress said backspace keylever, when said last-named key is depressed, comprising first elongated movable means extending from said keylever supported by said element along said element to a position adjacent said backspace keylever, and

d. second elongated means extending along said mounting element from said keylever supported by said element to a position adjacent said ribbon field selecting means and then extending to operatively engage the ribbon field selecting mechanism, said second elongated movable means including means for moving said ribbon field selecting mechanism to select a given ribbon field when said last-named key is depressed.

3,997,048

CONVEYOR SYSTEMS

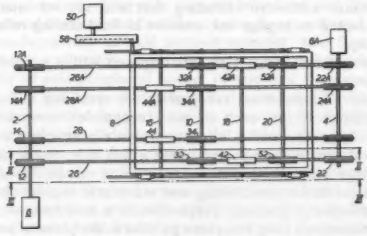
Peter D. Hardy, Welwyn Garden City, England, assignor to Metal Box Limited, Reading, England

Filed July 17, 1975, Ser. No. 596,751

Claims priority, application United Kingdom, July 19, 1974, 32061/74

Int. Cl.² B65G *47/31*

U.S. Cl. 198—577 8 Claims



2. A conveyor handling system for separating into discrete batches a stream of articles arriving at regular intervals, comprising

two endless belts extending between first and second locations,

means for driving the two endless belts at the same predetermined speed in the same sense,

a carriage movable between the first and second locations and guiding intermediate portions of the said endless belts so that one belt forms the upper run of an intermediate portion of the conveyor system while the other belt forms the upper run of the conveyor system both upstream and downstream of the intermediate portion,

means coupled to the carriage to reciprocate the carriage at a speed greater than the predetermined speed between a first, upstream position where the said intermediate portion lies adjacent a loading position at which the stream of articles are to be loaded onto the conveyor system and a second, downstream position where the upstream portion of the conveyor lies adjacent the loading position, and

means for locking the said one belt to the carriage when the

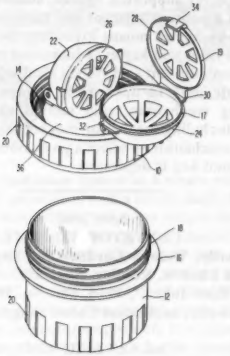
carriage performs its forward stroke from the first to the second position so as to accelerate the said one belt and therefore the intermediate portion and allow the said one belt to move freely relative to the carriage during the return stroke so that the said one belt and therefore the intermediate portion moves at its predetermined speed.

3,997,049

ENCLOSURE FOR HARD AND SOFT CONTACT LENSES

Guy J. Sherman, Sarasota, Fla., assignor to Milton Roy Company, St. Petersburg, Fla.

Filed Sept. 4, 1975, Ser. No. 610,226
Int. Cl.² A45C *11/04*; B65D *85/54*
U.S. Cl. 206—5.1 **13 Claims**



1. A container for retaining and conditioning both hard and soft contact lenses, comprising:

an outer enclosure including first and second members adapted to engage one another in fluid-sealing relationship;

a pair of first hinge elements disposed within one of said members;

a pair of foraminous receptacles for receiving individual contact lenses, each of said receptacles comprising a body portion and a lid portion pivotally attached to said body portin for opening about a first axis, and a second hinge element pivotally engaging one of said first hinge elements for constraining said receptacle to pivot about a second axis generally perpendicular to said first axis, said second axis lying in a plane parallel to the plane of said lid portion;

said first hinge elements being spaced to allow said receptacles to be pivoted into generally parallel relationship so that the lids thereof confront one another.

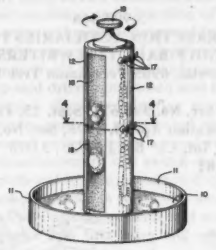
3,997,050

JEWELRY CADDY

Chad W. Patterson, 619-28th St., Ogden, Utah 84403

Filed Feb. 17, 1976, Ser. No. 658,348
Int. Cl.² B65D *1/34*
U.S. Cl. 206—75 **6 Claims**

1. A jewelry caddy comprising a base structure; an upstanding, elongate element having a smaller cross-sectional dimension than the corresponding dimension of the base structure; means for connecting one end of the upstanding element to the base structure so that the upstanding element can rotate with respect to the base structure; a plurality of support elements extending from the upstanding element, said support elements being adapted to hold articles of jewelry; and a layer of material capable of being easily penetrated by a needle or pin, said layer of material covering at least a portion of the surface of the upstanding element so that jewelry having pin



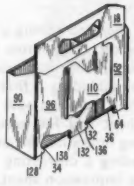
type attachments can be pinned to the material for convenient display and storage.

3,997,051

ARTICLE CARRIER

Earl J. Graser, Monroe, La., and Glen Ray Harrelson, Gulf Breeze, Fla., assignors to Olinkraft, Inc., West Monroe, La.

Filed Oct. 6, 1975, Ser. No. 620,075
Int. Cl.² B65D *75/00*
U.S. Cl. 206—173 **2 Claims**



1. A paperboard article carrier comprising

a pair of parallel side walls,

a pair of end walls joining the ends of the side walls,

a center section extending between the end walls parallel to the side walls,

a carrier bottom attached to both of the side walls, and having formed on both of its ends a locking notch and having a locking hole defined therein,

first and second end locking tabs formed on the center section each projecting into a respective one of the locking notches to serve as primary supports for the carrier bottom, and

a locking projection depending from the center section and having formed thereon two center locking tabs, the locking projection locking into the locking hole to serve as a secondary support for the carrier bottom, only one of the locking tabs at a time locking onto the edge of the locking hole.

3,997,052

METHOD FOR FABRICATION OF COMMUNICATIVE BUTTONS AND BUTTONS MADE THEREBY

Albert W. Eddy, Rte. 1, and Roger W. Lyngklip, Rte. 3, both of Winona, Minn. 55987

Filed Dec. 2, 1974, Ser. No. 528,787
Int. Cl.² A44B *7/00*; B23P *11/02*; B29C *17/04*; B65B *47/10*
U.S. Cl. 206—348 **14 Claims**

1. A method of constructing molded decorative buttons removably secured to a consumable sheet, using a mold with a plurality of female cavities therein, each having a substantially planar surface surrounding said cavity edge, a rigid restrictor sheet having a plurality of apertures therein, each

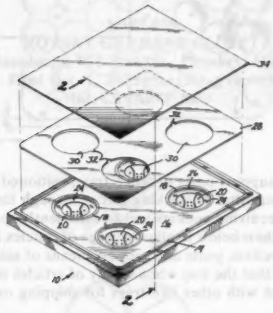
being smaller than that defined by an edge of an associated cavity, and a sheet of thermoplastic material, comprising the steps of:

a. placing said restrictor sheet with a first side thereof in contact with the mold surface with the apertures thereof centrally positioned over said cavities;

b. placing said sheet of thermoplastic material in contact over the other side of said restrictor sheet with portions thereof completely covering said apertures;

c. heating said thermoplastic material to a moldable state;

d. developing a pressure differential above and below said



thermoplastic material over said apertures to cause said material to be forced through said apertures into said cavities and into contact with the walls of said cavities and portions of said restrictor sheet, whereby shells having peripheral inwardly facing grooves adjacent the first side of said restrictor sheet are formed in said cavities;

e. removing said restrictor sheet and molded material from said cavities; and

f. trimming unmolded plastic material on the other side of said restrictor sheet from between said shells to form said buttons removably secured to said consumable sheet.

10. The product of the process as set forth in claim **1.**

3,997,053

TOOL HOLDER

John R. Bondhus, R.R. No. 2, Monticello, Minn. 55362

Filed Aug. 18, 1975, Ser. No. 605,311

Int. Cl.² B65D *85/20*

U.S. Cl. 206—377 **9 Claims**

1. In combination, a tool holder and a plurality of tools, each of which has a longitudinal part which has at least one flat side, said tool holder being formed of resiliently yieldable material and having a plurality of longitudinal passages therein, each of a cross sectional configuration receiving freely the longitudinal part of one of the tools, each of said passages having an inwardly projection portion having a flat inner face spaced from the opposite portion of said passage by a distance substantially as great as the distance between said flat side of the longitudinal part and the opposite portion of the tool therein but less than the distance between other opposite portions of said tool part a first of which opposite portions is adjacent said flat side so that said flat side thereof is parallel to and adjacent the flat inner face of said projecting portion, said tool can be passed through said passage past said inwardly projecting portion but when said tool is rotated about its longitudinal axis after insertion into said passage, said first of said opposite portions of the longitudinal part of said tool is moved into gripping relation with said flat inner face to retain the tool in position.

3,997,054

WATERTIGHT PACKAGE APPARATUS

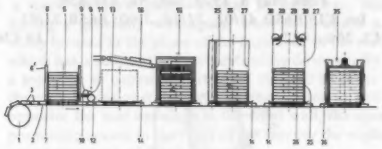
Marius Leopold Hypolite Berghgracht, Place Joyale Vineuil-sur-Firmin pres Chantilly, Chantilly (Oise), France

Continuation-in-part of Ser. No. 397,316, Sept. 5, 1973, abandoned. This application Mar. 3, 1975, Ser. No. 554,557

Claims priority, application Luxembourg, June 15, 1971, 63337

Int. Cl.² B65D *19/00, 71/00*

U.S. Cl. 206—386 **2 Claims**



1. A watertight palletless package for protecting a plurality of stacked articles comprising a pair of enlongated spaced generally parallel support members, a first flexible thermoplastic sheet overlying said support members and having a peripheral border, said first sheet being firmly adhered to the top surfaces only of said support member, said first sheet receiving a plurality of articles in stacked relationship inwardly of said peripheral border of said first sheet and supported by said support members, said peripheral border being turned upwardly along said articles, a second flexible thermoplastic sheet completely covering the vertical sides and the top of the articles, said second sheet having a lower edge sealingly engaging said upwardly turned peripheral border of said first sheet, and said first and second sheets being shrunk into intimate engagement with said articles, whereby said first and second sheets hold the articles in assmbled relationship and protect the same from the elements.

3,997,055

FULL DEPTH TRANSPORT CASE HAVING A REMOVABLE SIDE PANEL

Theodor M. Box, 1108 Aileen Road, Brielle, N.J. 08730

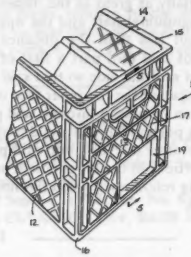
Filed Aug. 11, 1975, Ser. No. 603,300

Int. Cl.² B65D *85/80, 45/16*

U.S. Cl. 206—427 **4 Claims**

1. A full depth rectangular plastic molded transport case for milk cartons having a bottom, three integrally formed upstanding sides, a fourth open side and an open top, an upper stacking rim extending around said top and across said open side, a lower stacking rim extending around the periphery of said bottom, a removable panel disposed between and in engagement with said stacking rims adapted to entirely enclose said open side, and tongue members extending outwardly from opposing edges of said panel adapted for disposal in engagement with and behind said upper and lower stacking

rims for releasably fastening said panel to said case so that said panel is completely removable from said case, whereby removal of said panel permits removal of said milk cartons through said open side.



3,997,056

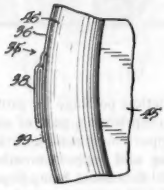
TAMPER-PROOF CLOSURE FOR A CONTAINER

Martin Mueller, Wonderlake, Ill., assignor to Owens-Illinois, Inc., Toledo, Ohio

Filed May 8, 1975, Ser. No. 575,536

Int. Cl.² B65D *41/02, 51/18, 5/00;* **B65B** *53/02*

U.S. Cl. 206—432 **13 Claims**



1. A container comprising: a base, a sidewall extending upwardly from the periphery of said base and defining an open top; closure means sealing the open top of said sidewall and forming a seam between said closure means and said sidewall; and a band of adhesive tape extending around the periphery of said container at the level of said seam, said tape having an adhesive side facing said container and a non-adhesive side facing away from said container, with a first portion of said adhesive side being attached to said closure means and with a second portion of said adhesive side being attached to said sidewall, one end of said band overlapping the opposite end thereof, with said overlapping end including juxtaposed folded integral portions of said band adhesively secured to one another to provide a gripping tab and with a portion of said overlapping end beyond said folded portions having its adhesive side adhesively attached to the non-adhesive side of an underlying portion of said band.

3,997,057

STACKING MEANS FOR PACKING TRAY

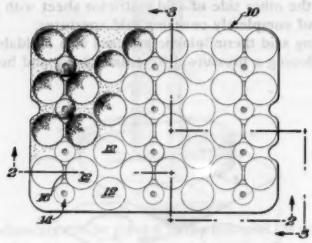
Edward P. Craig, Waterville, Maine, assignor to Keyes Fibre Company, Waterville, Maine

Filed Dec. 6, 1974, Ser. No. 530,172

Int. Cl.² B65D *21/04, 81/16*

U.S. Cl. 206—507 **8 Claims**

1. A molded packing tray having a first plane with multiple rows of downwardly dished article receiving pockets extending below said plane, multiple rows of upwardly directed support posts extending above said plane, a majority of the article receiving pockets closely adjoining each other whereby at least a portion of the upper walls of the closely adjoining pockets at the point where they intersect the plane are contiguous, multiple rows of support means below said plane, substantially all of the support means underlying the contiguous intersection of the closely adjoining pockets with said plane, the rows of support means being located to rest on cooperating rows of support posts of a like tray positioned therebelow to avoid transmittal of stacking forces through the bottom of the article receiving pockets and to sufficiently space the tray from a tray therebelow to allow storage of articles between the trays, the pockets, posts and support means of said tray being arranged so that the tray when empty of articles may be compactly nested with other like trays for shipping or storing.



3,997,058

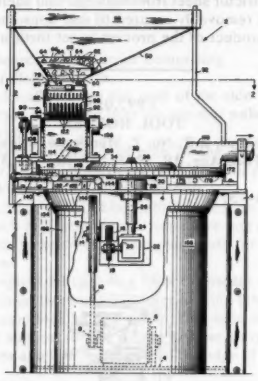
CAPSULE INSPECTION MACHINE

Henry W. Greer, Philadelphia, Pa., and George E. Martell, Runnemede, N.J., assignors to SmithKline Corporation, Philadelphia, Pa.

Filed Jan. 29, 1976, Ser. No. 653,299

Int. Cl.² B07C *5/06, 5/36*

U.S. Cl. 209—75 **5 Claims**



1. A capsule inspection machine for capsules having a cap and a body comprising:

a horizontal ring having vertical openings having a minimum diameter equal to a predetermined maximum capsule cap diameter for the reception of individual capsules,

means to rotate said ring,

capsule feeding means,

a sorting wheel for receiving capsules from the feeding means having plates perpendicular to the axis of the wheel and spaced apart a distance greater than the diameter of a capsule body and slightly less than the minimum desired diameter of a capsule cap to pass through uncapped bodies and carry capped bodies with caps of the desired minimum diameter,

means to rotate the wheel to advance retained capped bodies and discharge them onto said ring, means for directing said capped bodies into said ring openings,

a fixed horizontal plate mounted below a portion of the ring to support the capped bodies received in said ring openings, said plate being a distance below said ring greater than the length of a capsule cap and less than the length of a capped body, and

said capped bodies being free to move in said ring openings and discharging by gravity from the ring on being moved beyond the plate.

3,997,059

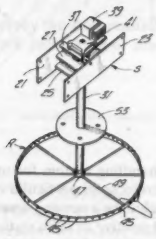
ROTARY GARMENT CLOSET

David D. Hanneman, 701 State St., Petoskey, Mich. 49770

Filed Oct. 1, 1975, Ser. No. 618,465

Int. Cl.² A47F *3/08*

U.S. Cl. 211—1.5 **2 Claims**



1. A rotary garment rack adapted to be installed in a closet comprising a combination drive and support assembly adapted to be located above the closet ceiling and having attaching means for supporting the assembly on joists above the closet ceiling, said attaching means including a pair of laterally spaced frame members and a cross member carried by and secured to said frame members, said assembly further including an electric motor carried on the assembly, a shaft extending vertically downward from the assembly through the cross member, said shaft adapted to extend downward through the closet ceiling into the interior of the closet, bearing means carried by the assembly and rotatably supporting the shaft, said bearing means including a flange member attached to the top portion of said shaft and having a first downwardly facing radial surface and said cross member having a second upwardly facing surface, said surfaces cooperating to carry the weight of said shaft, a circular garment hanger member connected to the lower end of said shaft by means of a plurality of radially extending spoke members, means connecting said electric motor with said shaft to rotate the same.

3,997,060

DISPLAY ASSEMBLY

Seymour L. Kunin, Paxton, Mass., assignor to S.H. Kunin Felt Co., Inc., Worcester, Mass.

Continuation of Ser. No. 390,900, Aug. 23, 1973, abandoned. This application July 14, 1975, Ser. No. 595,611

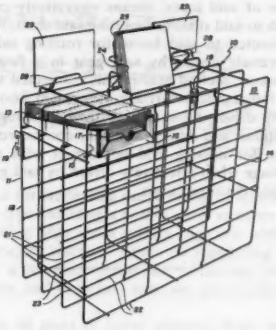
Int. Cl.² A47F *5/01*

U.S. Cl. 211—126 **5 Claims**

1. A display assembly, comprising:

a. a rack having a front face with a plurality of rectangular openings, the rack being formed of wire elements welded together in vertical, horizontal, and transverse positions,

b. a plurality of trays located in the rack, each tray being slideable in and out of one of the openings, each tray being open-topped and having a bottom wall, a front wall of the same height as the opening, and side walls which taper rearwardly and downwardly, each side wall being as high as the front wall where it is attached thereon and has little height at the rear, each tray being formed from a sheet of paper board with a rectangular bottom wall, the front wall being formed from a double thickness of board integral with the front edge of the bottom wall, the side walls being provided with the tabs which extend from the front edges of the walls into a space between the two thicknesses of the front wall, and



c. a stack of fabric pieces located in each tray, the tray having a generally rectangular front face which is normally located in the plane of the front face of the rack and which has a substantial notch extending downwardly from a top edge to expose a portion of the said stack to view, the rack having rear openings corresponding to and lying opposite the said openings in the front wall, the openings permitting access to the rears of the tray for the replenishing of the stack of fabric pieces.

3,997,061

TOY CRANE

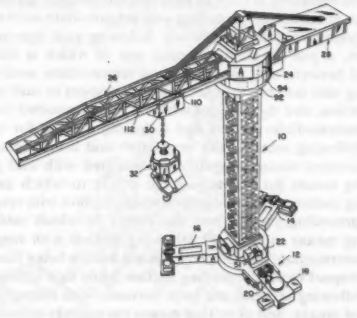
Hiroshi Sano, Tokyo, Japan, assignor to Tomy Kogyo Co., Inc., Tokyo, Japan

Filed June 25, 1975, Ser. No. 590,060

Claims priority, application Japan, July 3, 1974, 49-78418[U]

Int. Cl.² B66C *23/02*

U.S. Cl. 212—63 **4 Claims**



1. A toy crane, comprising:

a base,

a tower supported by the base and extending upwardly therefrom;

a boom mounted on said tower to rotate in a plane about said tower;

a carriage mounted to travel along said boom;

an implement suspended from said carriage for movement up and down with respect to said carriage;

a control station mounted on said base comprising a knob mounted for rotation and a lever operable between three positions; and

an operating system within said tower comprising, a vertical shaft, a gear mounted to a said shaft for rotation therewith, said gear and shaft also being mounted and actuated by said lever for reciprocating up and down movement between three positions corresponding to said three positions of said lever, means operatively connecting said knob to said shaft for rotating said shaft, first gear means connected to said boom for rotating said boom when selectively driven by said gear in a first of said three positions, second gear means connected to said carriage for moving said carriage along said boom when selectively driven by said gear in the second of said three positions, and third gear means connected to said iimplement for moving said implement with respect to said carriage when selectively driven by said gear in the third of said three positions.

3,997,062

MULTI-SECTION TELESCOPIC JIBS

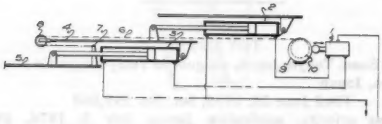
Donald Hassall, Whyteleafe, 10 Underhill Road, Cleadon, Sunderland, County Durham, England

Filed Mar. 14, 1973, Ser. No. 341,231

Claims priority, application United Kingdom, Mar. 17, 1972, 12543/72

Int. Cl.² B66C *23/64*

U.S. Cl. 212—144 **4 Claims**



1. In a retractable and expandable assembly, a plurality of sections movable one with respect to the next, said plurality of sections including at least an intermediate section, a preceding section immediately preceding said intermediate section, and a following section immediately following said intermediate section, a pair of moving means one of which is interconnected between said preceding and intermediate sections for moving said intermediate section with respect to said preceding section, and the other of which is interconnected between said intermediate section and following section for moving said following section with respect to said intermediate section, control means operatively connected with said pair of moving means for controlling the extent to which said one moving means moves said intermediate section with respect to said preceding section and the extent to which said other moving means moves said following section with respect to said intermediate section, said control means being fixed only with respect to said preceding section while said intermediate and following sections are both movable with respect to said control means, and detecting means operatively connected at least with said intermediate and following sections and operatively connected to said control means for detecting when there is an inequality of movement between said intermediate and following sections, on the one hand, and said intermediate and preceding sections, on the other hand, and automatically actuating said control means to control at least one of said pair of moving means for restoring equality of movement between the intermediate section and the following section, on the one hand, and said intermediate section and preceding section, on the other hand.

3,997,063

APPARATUS FOR HIGH-SPEED ACCURATE COUNTING AND HANDLING OF DISCRETE OBJECTS SUCH AS TABLETS

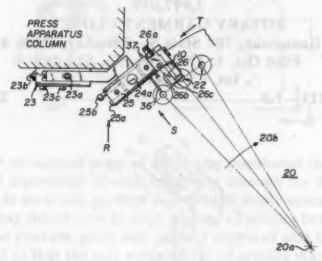
Jim Mills Adams, West Caldwell, and Edward Francis deZabala, Pequannock, both of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Filed Mar. 21, 1974, Ser. No. 453,238

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 2, 1976

Int. Cl.² G07F *11/00*

U.S. Cl. 214—1 C **2 Claims**



1. A counting and handling system for use with high-speed apparatus making discrete, solid particular objects somprising:

a. sensing means including a sensing arrangement predeterminably arranged relative to each station of the apparatus at which the formation of the objects is virtually completed, at least one said sensor arrangement including a strain detecting sensor for providing a sensing signal whenever an object is properly formed;

b. control counter means responsive to said sensing means for providing a separate continuous count of the objects sensed by each said sensor arrangement, said counter means including first means enabling a separate presetting of the maximum desired count of sensed objects for each said station of the apparatus; and

c. gating and handling means including a gated dispensing arrangement associated with each said station of the apparatus and having a first portion thereof situate proximate the said respective station, each said gated dispensing arrangement being adapted to predeterminably control the procession of the objects from the respective station of the apparatus to a pre-established destination under the supervision of said first means.

3,997,064

LOADING DEVICE

Kiyoshi Ito, Chiba, Japan, assignor to Kabushiki Kaisha Daini Seikosha, Japan

Filed Apr. 2, 1975, Ser. No. 564,298

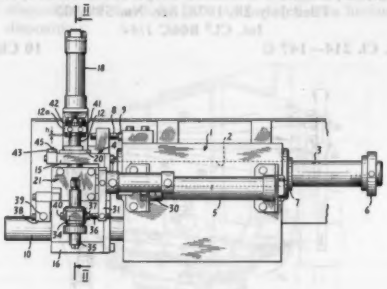
Claims priority, application Japan, Apr. 2, 1974, 49-37249; Apr. 2, 1974, 49-37250

Int. Cl.² B65G *61/00*

U.S. Cl. 214—1 BB **4 Claims**

1. A loading device comprising: a loading arm swingable and movable parallel to the swing axis thereof and provided with a pick-up head for holding works thereon, a mobile frame movable together with said loading arm but unswingably supported by a head frame, a first group of one or more stoppers mounted on said mobile frame, each of said stoppers being spaced in a location corresponding to one of another group of stoppers, said another group of stoppers being equal in number to said first group of stoppers and mounted on said loading arm at predetermined angular locations around the swing axis thereof, moving means to move said loading arm together with the mobile frame, and swinging means to swing said loading

arm and to thus press one of the stoppers on the arm against the corresponding stopper on the mobile frame during the arm



swivel stroke, whereby the stop position of the loading arm is determined for work picking up or placing.

3,997,065

DEVICE FOR POSITIONING SUBSTRATE WAFERS

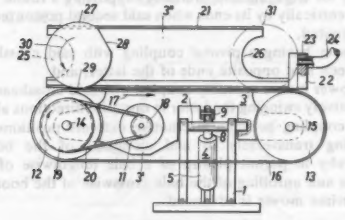
Erhard Jaksch, Dresden, Germany, assignor to Jenoptik Jena G.m.b.H., Jena, Germany

Filed Dec. 22, 1975, Ser. No. 641,708

Claims priority, application Germany, Mar. 4, 1975, 184533

Int. Cl.² B65G 47/24

U.S. Cl. 214—1 BD 2 Claims



1. A device for positioning substrate wafers having a flat zone on their periphery, comprising

a support having a pinion,

a tilting member, being tiltably arranged about said pinion of said support,

means for tilting said tilting member about said pinion, said means being secured both, to said support and to said tilting member,

a drive means provided at said tilting member,

a first roller and a second roller, both rollers being rotatably mounted on opposite ends of said tilting member in one plane,

at least one of said rollers being connected to said drive means,

a belt being guided by said first and said second rollers,

a support track provided on said tilting member, said support track being substantially arranged along said tilting member and being substantially in parallel to said belt,

said support track being adapted to receive and to convey said substrate wafers.

3,997,066

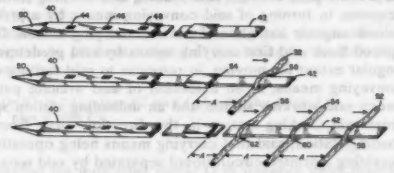
TOBACCO LATHING AND SPACING MACHINE

Ernest M. Thielen, R.F.D. No. 2, Richmond, Minn. 56368

Filed Apr. 2, 1975, Ser. No. 564,661

Int. Cl.² A01D 45/16

U.S. Cl. 214—5.5 7 Claims



1. A machine for facilitating the stringing of tobacco plants on laths of the type including a hollow spear member having a point at its leading edge and a trailing edge into which a lath to be loaded may be inserted, means for supporting said hollow spear and a conveyor means for advancing said plants along said spear, and onto said lath, the improvement comprising:

a. a plurality of pairs of spear gripping dogs, each pair having oppositely disposed members engageable against said spear for spear suppot in the vertical plane;

b. means synchronized with said conveyor means for opening and closing said pairs of gripping dogs in a predetermined sequence as said tobacco plants are advanced along said spear by said conveyor means; and

c. variable spacing means, coupled to said conveyor means for advancing said plants, for selectively positioning said plants at intervals along said lath.

3,997,067

APPARATUS FOR TRANSPORTING SUCCESSIVE PRINTED CIRCUIT BOARDS TO AND FROM A WORK STATION

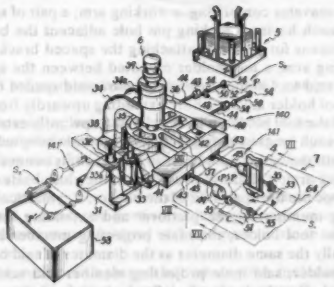
Zenichi Murata, Sagamihara, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Oct. 20, 1975, Ser. No. 624,298

Claims priority, application Japan, Oct. 24, 1974, 49-122889; Oct. 30, 1974, 49-125281; Oct. 31, 1974, 49-125870; Mar. 10, 1975, 50-28841

Int. Cl.² B65G 59/06

U.S. Cl. 214—8.5 K 7 Claims



1. An apparatus for transporting successive printed citcuit boards to and from a working station at which a plurality of operations are performed thereon, comprising: positioning means at said working station for supporting a printed circuit board during the performance of said operations thereon; means for turning said positioning means so as to change the orientation of a printed circuit board supported thereon for

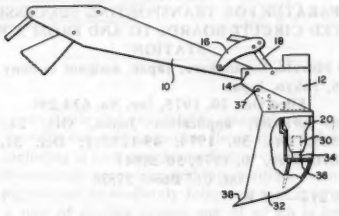
said operations, respectively; a magazine for containing a stack of the printed circuit boards and being located at a loading station spaced from said working station; separating means for separating the printed circuit boards one-by-one from a stack thereof in said magazine; and conveying means turnable about an axis spaced equally from said loading and working stations and including first carrying means movable in an arcuate path between said loading and working stations in response to turning of said conveying means by a predetermined angular extent, and second carrying means fixedly spaced from said first carrying means by said predetermined angular extent for moving, in response to said turning of the conveying means, in an extension of said arcuate path between said working station and an unloading station spaced from said working station in the direction away from said loading station, said first carrying means being operative for receiving a printed circuit board separated by said separating means from a stack in said magazine at said loading station and delivering such board to said positioning means at said working station while said second carrying means is simultaneously operative for picking up a printed circuit board from said positioning means after the completion of said operations thereon and discharging the completed board at said unloading station.

3,997,068

ASSEMBLY FOR ATTACHMENT TO EXCAVATORS

David Lock, Manchester, England, assignor to Ingersoll-Rand Company, Limited, London, England

Filed June 19, 1975, Ser. No. 588,382
Int. Cl.² E02F *3/70*, *3/96*; B25D *17/00*
U.S. Cl. 214—145 A 1 Claim



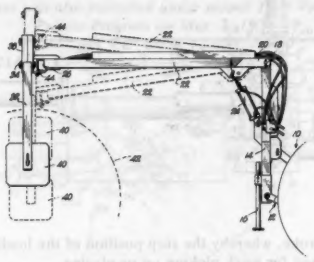
1. An excavator comprising: a working arm; a pair of spaced brackets each having a locking pin hole adjacent the bottom thereof; means for pivotally attaching the spaced brackets to the working arm; a tool holder mounted between the spaced brackets, said tool holder extending below said spaced brackets, the tool holder having a bore extending upwardly from the bottom of the tool holder; a bucket having upwardly extending brackets, each bracket having a locking pin hole adapted to be aligned with the locking pin holes in the brackets connected to the working arm; a platform provided on the closed side of the bucket opposite the open side of the bucket; a cylindrical male projecting member on the platform and extending into the bore in the tool holder, the male projecting member having substantially the same diameter as the diameter of said bore in the tool holder, said male projecting member and said bore serving to locate the bucket in a fixed position relative to the tool holder and a locking pin extending through said bucket brackets locking pin holes, and through said locking pin holes in the spaced brackets attached to the working arm whereby the bucket may be detached without operating the means for pivotably attaching the spaced brackets to the working arm, by removing the locking pin and slidably removing the male projecting member from the bore in the tool holder.

3,997,069

ROUND BALE HAULER AND UNROLLER

James Edson McCanse, and Timothy A. Sevick, both of Oregon, Ill., assignors to Hesston Corporation, Hesston, Kans.

Filed July 28, 1975, Ser. No. 599,583
Int. Cl.² B66C *1/44*
U.S. Cl. 214—147 G 10 Claims



1. Round bale handling apparatus for use with a mobile prime mover, said apparatus comprising:

an elongated, normally fore-and-aft extending boom;

means at one end of said boom for mounting the latter on said prime mover for up-and-down swinging movement relative to the prime mover;

first power means operably coupled with said boom for accomplishing said swinging movement thereof;

an elongated crosshead at the opposite end of said boom having a pair of opposite ends remote from the boom;

a pair of arms swingably depending from said opposite ends of the crosshead;

second means operably coupled with said arms for swinging the latter toward and away from one another below said crosshead;

a pintle projecting inwardly from each of said arms respectively for engaging and rotatably supporting a round bale concentrically by its ends when said second power means is actuated,

said boom having a pivotal coupling with said crosshead between said opposite ends of the latter; and

third power means operably coupled with said crosshead for selectively swinging the latter in opposite directions about said coupling between alternative extreme positions extending transversely to and alongside of the boom, whereby to permit pickup of a bale lengthwise of the boom and unrolling of the bale crosswise of the boom as the prime mover is advanced.

3,997,070

STAIR LANDING MOVING METHOD

William Smith Lee, New Orleans, La., assignor to Lee Inventions, Inc., New Orleans, La.

Division of Ser. No. 461,290, April 16, 1974, Pat. No. 3,913,763, which is a division of Ser. No. 216,597, Jan. 10, 1972, Pat. No. 3,804,275, which is a continuation-in-part of Ser. No. 9,223, Feb. 6, 1970, Pat. No. 3,633,774. This application June 26, 1975, Ser. No. 590,433
The portion of the term of this patent subsequent to Apr. 16, 1991, has been disclaimed.
Int. Cl.² B65G *67/02*
U.S. Cl. 214—152 2 Claims

1. A method of moving a load up stairs which includes a middle landing of relatively limited dimensions between two angularly disposed flights of stairs comprising the following steps:

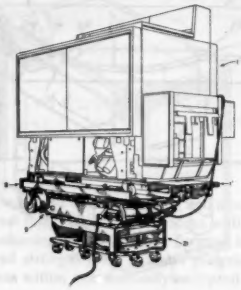
a. providing a powered stair climber;

b. mounting the load on the stair climber;

c. powering the stair climber through one flight of stairs;

d. providing an inclined collapsible dolly on the landing;

e. mounting the stair climber on the inclined collapsible dolly;
f. changing the effective horizontal, longitudinal dimension of the loaded stair climber and dolly by changing the disposition of the dolly from an inclined to a horizontal disposition;



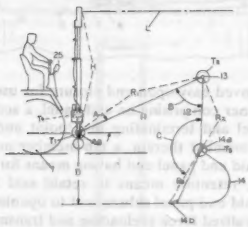
g. rotating the dolly while in its horizontal disposition with the loaded stair climber thereon to align it with the next flight of stairs;
h. changing the disposition of the dolly back to its inclined disposition; and
i. moving the stair climber off of the inclined dolly onto the next flight of stairs.

3,997,071

METHOD AND APPARATUS FOR INDICATING EFFECTIVE DIGGING DEPTH OF A BACKHOE

Ted L. Teach, Dayton, Ohio, assignor to Laserplane Corporation, Dayton, Ohio

Filed Aug. 14, 1975, Ser. No. 604,665
Int. Cl.² G08B *5/22;* **E02F** *9/26*
U.S. Cl. 214—761 **2 Claims**



1. Apparatus for indicating the working depth of the digging edge of the bucket of a backhoe, said backhoe being the type having an outreach boom horizontally pivotally attached at one end to a vehicle, a downreach boom horizontally pivotally attached to the free end of the outreach boom, a digging bucket horizontally pivotally attached to the free end of the downreach boom and power means for producing relative pivotal movements of all said pivotally inter-connected elements, comprising, in combination:
1. electrical means for generating signals respectively proportional to:
a. the angle A between the outreach boom and the horizontal;
b. the angle B between the outreach boom and the downreach boom;
c. the angle C between the downreach boom and the digging edge of the bucket;
d. the distance R1 between the two pivot axes on the outreach boom;
e. the distance R2 between the pivot axes of the downreach boom; and
f. the distance R3 between the pivot axis of the digging bucket and the digging edge of the bucket;
2. second electrical means for generating signals respectively proportional to sinA, sin (A plus B), and sin (A plus B plus C);
3. third electrical means for combining said aforementioned signals to produce a signal D according to the following equation:

$$D = R1\sin(A) \text{ minus } R2 \sin(A \text{ plus } B) \text{ plus } R3\sin(A \text{ plus } B \text{ plus } C);$$

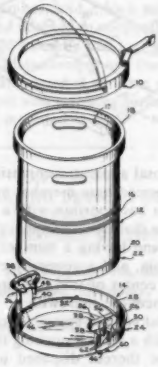
and
4. means for indicating signal D in distance units thereby indicating the depth of the bucket digging edge relative to the pivotal mounting axis of the outreach boom on the vehicle.

3,997,072

COMPACTOR CONTAINER WITH REMOVABLE BOTTOM

Lauren W. Guth, Louisville, Ky., assignor to General Electric Company, Louisville, Ky.

Filed Feb. 24, 1975, Ser. No. 552,115
Int. Cl.² B65D *11/18, 25/14, 25/32;* **B30B** *15/00*
U.S. Cl. 220—1 T **4 Claims**



1. A refuse receptacle assembly for a trash compactor comprising:
a tapered cylindrical sleeve defining the side wall of said receptacle assembly, said sleeve having an open, smaller-diameter, first end portion, and an open, larger-diameter, second end portion, said first end portion being sized to permit the passage of a compacting ram therethrough and said second end portion including compression-resistant column means integral with and parametric to said sleeve; and
a removable dish-shaped bottom portion including a parametric U-shaped channel, opening upwardly, one leg of said U-shaped channel being integral with the peripheral rim of said dish-shaped bottom portion, said U-shaped channel further having its free-standing leg extending upwardly beyond the rim of said dish-shaped bottom portion, said U-shaped channel also including clamp means attached adjacent said free-standing leg, said channel being sized to receive said compression-resistant

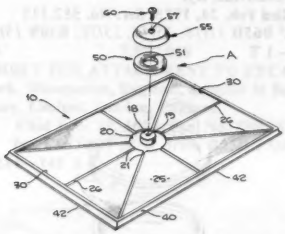
column and said clamp means between its legs, said clamp means being movable between a first extended position and a second contracted position to wedgingly intercede between said free-standing leg of said U-shaped channel, said clamp means being further defined as including two members attached and movable with respect to each other, one of which is abuttable against said free-standing leg of said channel and the other engageable with said compression-resistant column of said sleeve and wherein said clamp means is flexibly attached to said U-shaped channel of said dish-shaped bottom portion to allow said clamp means to swing radially outwardly beyond the outer periphery of said U-shaped channel portion to permit easy placement of said compression-resistant column of said sleeve therein and to provide means for removably attaching said dish-shaped bottom portion to said sleeve.

3,997,073

GREASE DISPOSAL APPARATUS

Carl E. Morris, 47 Dapplegray Lane, Rolling Hills Estates, Calif. 90247

Filed Sept. 2, 1975, Ser. No. 609,370
Int. Cl.² B65D *1/34, 25/00*
U.S. Cl. 220—1 C **3 Claims**



1. Grease disposal apparatus comprising, in combination:
an integrally formed base member made of a plastic material, having a base portion with a flat generally circular upper surface thereon, a peripheral wall surrounding said flat surface and having a number of grease entry ports formed therein, and a generally cylinder pedestal rising up from the center of said flat circular surface and substantially concentric therewith;
an elongated flat strip of grease absorbent material formed into a roll with a central opening therein, said roll having one end face thereof disposed upon said flat circular surface of said base member and said central opening thereof receiving said pedestal;
a generally circular cover member disposed above and covering said roll, the peripheral edge of said cover member being disposed in close proximity to the upper surface of said peripheral wall of said base member; and
means detachably securing the center of said cover member to said pedestal of said base member.

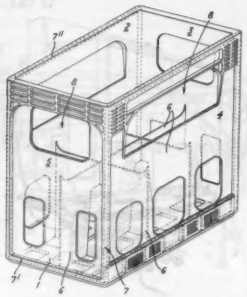
3,997,074

CRATE

Terence H. C. Shead, Chorley Wood, England, assignor to Worldwide Plastics Development Limited, Wolverhampton, England

Filed Feb. 24, 1975, Ser. No. 552,666
Claims priority, application United Kingdom, Mar. 13, 1974, 11259/74
Int. Cl.² B65D *1/24, 1/48*
U.S. Cl. 220—71 **3 Claims**

1. An open-topped rectangular crate formed of a synthetic plastic material comprising; a substantially rigid crate having two opposing side walls and two opposing end walls and a bottom and edges being formed where the walls and bottom meet, a continuous single length of reinforcement internally positioned in the walls of the crate, the reinforcement being in the shape of a deformed continuous loop and extending substantially along the upper horizontal edges of two opposing walls of the crate, down adjacent to and along the four vertical corner edges of the crate and along the bottom horizontal edge of the other two opposing walls of the crate to provide the sole reinforcement for the crate to facilitate reinforcement for the crate if stacked in vertical position or on its side.

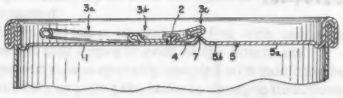


3,997,075

NON-DETACHABLE END UNIT

Wayne T. Chiappe, Hinsdale, Ill., assignor to Continental Can Company, Inc., New York, N.Y.

Continuation of Ser. No. 546,847, Feb. 3, 1975, abandoned. This application Nov. 13, 1975, Ser. No. 631,572
Int. Cl.² B65D *41/32*
U.S. Cl. 220—268 **15 Claims**



1. An improved easy-open end closure for use on a can or similar container comprising an end panel, a score formed in said end panel and terminating in a point and defining an opening flap member therein, a tab member non-removably attached to said end panel and having means for opening said flap member, retention means to retain said flap member attached to said end panel subsequent to opening of said end panel, and localized force preloading and transmission means on at least one of said members at said point for prestressing said flap member toward the end panel and concentrating the opening force from said tab member to said flap member to open said container.

3,997,076

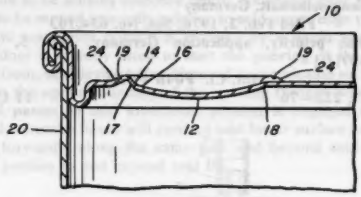
TABLESS CONTAINER OPENING DEVICE

Charles L. Jordan, Pittsburgh, Pa., assignor to Aluminum Company of America, Pittsburgh, Pa.

Division of Ser. No. 466,405, May 2, 1974, Pat. No. 3,946,683, which is a continuation-in-part of Ser. No. 318,476, Dec. 26, 1972, abandoned. This application Nov. 26, 1975, Ser. No. 635,715
Int. Cl.² B65D *17/00*
U.S. Cl. 220—268 **7 Claims**

1. A container wall made of work hardened sheet metal having a generally planar wall with at least one substantially rigid inwardly displaceable opening panel therein bounded in

substantial part by a weakening line which includes a fracturable web of metal defining a locus of separation of the opening panel from the adjacent portion of said wall, an integral outwardly projecting deflectable portion in said adjacent wall



portion adjacent to said weakening line, and a zone of coining of reduced metal thickness in said adjacent wall portion adjacent to said weakening line to facilitate forming the weakening line of a desired strength level in sheet material which may vary in thickness within commercially accepted ranges.

3,997,077

CONTAINERS WITH SCREW CAPS

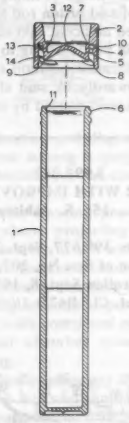
Patrick J. Mill, Beaconsfield, and John C. Walkley, High Wycombe, both of England, assignors to G. D. Searle & Co. Ltd., Bucks, England

Filed Nov. 12, 1975, Ser. No. 631,283

Claims priority, application United Kingdom, Nov. 13, 1974, 49094/74

Int. Cl.² B65D *41/04*

U.S. Cl. 220—288 3 Claims



1. A screw cap for a liquid container having an external screw thread thereon which comprises an outer sleeve, a portion of which has an internal screw thread arranged to co-operate with an external screw thread on the container; an inner cylindrical plug secured at one end within the sleeve by a bridge portion and arranged to fit inside the container; a flange at the bottom, outer peripheral edge of the plug, said flange being arranged to make an interference fit with the inside of the container; and an upwardly convex, domed closure diaphragm closing the plug, said domed diaphragm and said flange being integrally joined at the bottom edge of said plug and forming an upwardly convex, continuous surface.

3,997,078

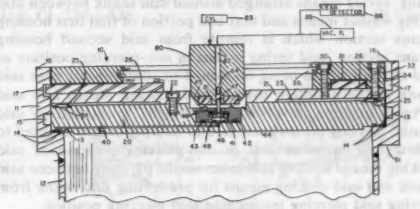
SEALING COVER FOR CONTAINERS FOR HAZARDOUS MATERIALS

Donald F. Melton, Minneapolis, and Karl E. Neumeier, Stillwater, both of Minn., assignors to Programmed & Remote Systems Corporation, St. Paul, Minn.

Filed Dec. 13, 1974, Ser. No. 532,623

Int. Cl.² B65D *45/00*

U.S. Cl. 220—315 17 Claims



1. A sealing cover for shipping containers comprising a first plate member, a seal member mounted on a first side of said first plate member and being adapted to engage a surface of a container to be sealed when said first plate member is forced in a first direction, a second plate member overlying said first plate member on a side thereof opposite from said seal member, at least portions of said second plate member being spaced from said first plate member, resilient means between said first plate member and said second plate member positioned to be adjacent the portion of said second plate member overlying said seal member, and a lock member carried by said cover assembly and adapted to cooperate with portions of a container to be sealed whereby said lock member will exert a force on said second plate member and through said resilient means to said first plate member to force said seal member into sealing engagement with a sealing surface on a container on which the cover is mounted.

3,997,079

AUTOMATIC INFLATING DEVICE FOR LIFESAVING DEVICES

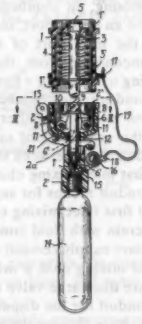
Wolfgang Niemann, Im Rehwinkel 4b, 2105 Seevetal 3, Germany

Filed Apr. 16, 1975, Ser. No. 568,429

Claims priority, application Germany, Apr. 17, 1974, 7413311[U]

Int. Cl.² B67B *7/24*

U.S. Cl. 222—5 9 Claims



1. An automatic inflating device for floating lifesaving devices, which includes housing means comprising a first section and a second section adapted to be threadedly connected to each other, said second having an axial bore, striking means

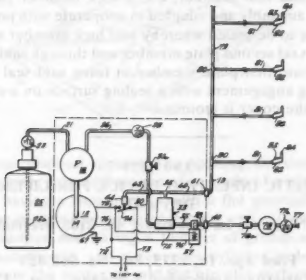
including piercing means and being reciprocably arranged in said axial bore of said second housing means section and being movable from a non-piercing position to a piercing position and vice versa, said second housing means section adjacent said piercing means for comprising means for detachably connecting thereto a compressed gas containing cartridge with a closure diaphragm adapted to be pierced by said piercing means in said piercing position, a shank provided and reciprocably guided in said first housing means section in the axial direction thereof, spring washer means connected to said shank, spring means arranged around said shank between said spring washer means and that end portion of that first housing means section which is remote from said second housing means section, said spring means in non-piercing position of said striking means being tensioned to continuously urge said shank in the direction toward said striking means into said piercing position, lever means pivotally journalled in said second housing means section, and holding means adapted to disintegrate in water and in non-piercing position of said striking means holding said lever means partially between said shank and said striking means for preventing said shank from moving said piercing means into said piercing position.

3,997,080

PRESSURIZED LIQUID MIXER AND DISPENSER SYSTEM

Hall Langstroth, Coral Gables, Fla., assignor to Watsco, Inc., Hialeah, Fla.

Filed Nov. 20, 1975, Ser. No. 633,619
Int. Cl.² B67D 5/08
U.S. Cl. 222—61 10 Claims



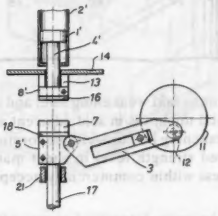
1. A pressurized liquid mixer and dispenser system for mixing a fluid concentrate supplied in a separate container with a diluent under pressure for intermittent dispensing of the diluted mixture comprising, in combination, a fluid pump having an inlet port and an outlet port, suction conduit means communicating with the inlet port of said fluid pump for withdrawing fluid concentrate from the fluid concentrate container, a fluid mixing unit having a first inlet mixing chamber at one end, a second mixing chamber communicating at one end with said first mixing chamber and an outlet port communicating with the other end of said second chamber, conduit means communicating between the outlet port of said fluid pump and said first inlet mixing chamber of said mixing unit, diluent supply conduit means for supplying diluent fluid under pressure to said first inlet mixing chamber of said mixing unit for mixing therein with fluid concentrate pumped by said fluid pump, a mixture supply conduit communicating with said outlet port of said mixing unit, a manually controllable, normally closed mixture discharge valve communicating with said mixture supply conduit for the dispensing for use of concentrate and diluent mixture flowing through said mixing unit, drive means for said fluid pump, and means controlled by a drop in pressure in said mixture supply conduit below a predetermined value upon actuation of said discharge valve for actuating said drive means for operation of said fluid pump.

3,997,081

APPARATUS FOR CONTROLLING THE OPERATION OF A PACKAGE FILLING DEVICE

Hermann Gernlein, and Klaus Wieschollek, both of Ettlingen, Germany, assignors to Industriewerke-Karlsruhe Augsburg Aktiengesellschaft, Germany

Filed Feb. 2, 1976, Ser. No. 654,103
Claims priority, application Germany, Feb. 5, 1975, 7503337[U]
Int. Cl.² F04B 41/06
U.S. Cl. 222—76 11 Claims



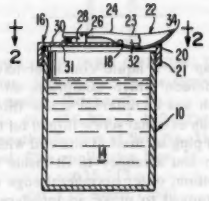
1. An apparatus for controlling the operation of a package filling device, comprising a cylinder having inlet means and discharge means for respectively taking in filling material and for discharging the filling material into a package to be filled, a piston rod connected to said piston, a clamp piece affixed to said piston rod, a slider slidable on said piston rod below said clamp piece, a drive mechanism connected to said slider to move it upwardly and downwardly on said piston rod through a path to cause said slider to contact said clamp piece and to raise it along with said piston rod and said piston to discharge material from said cylinder, said rod being movable downwardly when said slider is moved downwardly by said drive mechanism to cause downward movement of said piston and to draw in an additional charge of filling material, and means to stop the operation of said piston rod and piston including a magnetic device located adjacent said clamp piece in the top position of travel of said piston acting to attract and hold said clamp piece in its uppermost position of travel, whereby, it will not be moved upwardly by said slider during the next upward movement of travel caused by said drive means.

3,997,082

LIQUID CONTAINER WITH IMPROVED POURING UNIT

Ronald F. Tucker, Jr., 156 S. Ashland Ave., Palatine, Ill. 60067

Continuation of Ser. No. 399,677, Sept. 21, 1973, abandoned, which is a continuation of Ser. No. 207,390, Dec. 13, 1971, abandoned. This application Sept. 8, 1975, Ser. No. 610,958
Int. Cl.² B67D 3/00
U.S. Cl. 222—108 11 Claims



1. In a container having means defining an upper edge portion of said container over which liquid can pass as the liquid is poured from the container; a liquid pouring control device having a spoon-shaped lower, outer surface and a

normally forwardmost tip, said surface having a normally lowermost portion and tapering smoothly and being unobstructed from said lowermost portion forwardly to said tip; and means coupled to the device for shiftably mounting the same on said container at a location permitting said lowermost portion to be initially disposed below said upper edge portion and to be moved upwardly relative to said upper edge portion as said lowermost portion is engaged by a liquid when the container is initially tilted to start the pouring of the liquid therefrom, said device being disposed to permit said surface to define the upper boundary of the opening through which the liquid passes as said lowermost portion is engaged by the liquid, whereby liquid will contact said lower surface and will flow forwardly along the same past and beyond said upper edge portion to and beyond said tip.

3,997,083

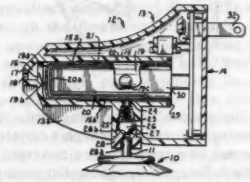
SHAVING LATHER HEATER AND DISPENSER HAVING HEAT STORING ELEMENT

Samuel L. McNair, Overland Park, Kans., assignor to Dazey Products Company, Kansas City, Mo.

Continuation-in-part of Ser. No. 488,892, July 15, 1974, abandoned. This application Oct. 24, 1974, Ser. No. 517,772

Int. Cl.² B67D *5/62*

U.S. Cl. 222—146 HA **4 Claims**



1. Apparatus for heating and dispensing material from an aerosol type container having a projecting valve stem for discharge of the material from the container, said apparatus comprising

a closed non-metallic housing provided with an integral internal tubular sleeve projecting from one inside wall, said sleeve terminating at the wall end thereof in a discharge opening to the exterior of the housing,

means defining a heating chamber within said sleeve, said chamber including an annular portion having concentric inner and outer walls composed of material of high heat conductivity, said chamber communicating with said discharge opening,

means defining a flow passageway through the wall of said housing and sleeve into said annular portion of said chamber for conducting material from said stem to said chamber, said flow passageway including a lateral opening through said sleeve, an annular space between the interior of the sleeve and the exterior of said outer wall of the heating chamber, and a lateral opening in the outer wall of the heating chamber,

a heat storing electric resistance heating element located within said inner wall of said chamber for heating said chamber,

and electric circuit means within the housing and connected with said heating element, said circuit means including connector members having portions extending externally of the housing for connection with an electric outlet.

3,997,084

CAULKING GUN ADAPTER FOR AN ELECTRIC HAND DRILL

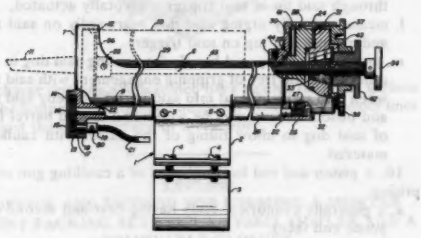
George B. Davis, Jr., 7512 Marbury Road, Bethesda, Md. 20014

Continuation-in-part of Ser. No. 446,961, Feb. 28, 1974, Pat. No. 3,913,399. This application Sept. 8, 1975, Ser. No. 611,548

The portion of the term of this patent subsequent to Jan. 21, 1992, has been disclaimed.

Int. Cl.² B67D *5/46*

U.S. Cl. 222—326 **18 Claims**



1. A caulking gun attachment for an electric hand drill including in combination securing means for fastening said gun to the body of said drill, a receptacle fastened to said securing means for receiving therein a caulking cartridge having a caulking dispensing nozzle thereon, a threaded piston movable when driven through said cartridge to force the caulking within said cartridge from said nozzle, driving means for said piston including a threaded nut disposed about the threaded surface of said piston and operative when rotated to drive said piston through said cartridge, a speed reducing drive train disposed for connecting said drill with said nut and operative when activated by operation of said drill to effect rotation of said nut, fixed means engaging said piston and operative upon rotation of said nut by said drill to prevent rotation of said piston with said nut and slipping clutch means interposed in said speed reducing drive train between said drill and said nut and operative to vary selectively the rate of rotation of said nut upon a predetermined movement retarding force being applied to said piston during operation of said drill.

3,997,085

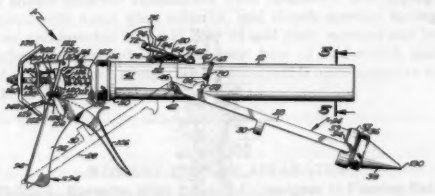
CAULKING GUN

Berkley James Lindquist, 857-84th Ave., NE., Minneapolis, Minn. 55432

Filed Jan. 15, 1976, Ser. No. 649,276

Int. Cl.² G01F *11/00*

U.S. Cl. 222—326 **13 Claims**



1. A caulking gun comprising in combination:

a. a barrel having an inner and outer end,

b. a dispensing tip,

c. means for releasably connecting said tip in sealing engagement with the outer end of said barrel,

d. a closure plate carried by the inner end of said barrel,

e. a handle,

f. means mounting said handle on said closure plate,

g. a trigger pivotally mounted on said handle,
h. a rod extending through an opening in said handle and an opening in said closure plate and extending within said barrel and outwardly of the rear end thereof,
i. a piston carried by one end of said rod and within said barrel,
j. a dog having a hole therethrough and through which said rod extends to allow a canting movement of said dog on said rod,
k. said trigger having a lug thereon for engagement with one end of said dog to cant said dog in one direction on said rod to grip and advance the rod and the piston thereon in the barrel for forcing caulking material outwardly through said tip as said trigger is pivotally actuated,
l. means normally urging said dog rearwardly on said rod and against said lug on said trigger,
m. means carried by said handle for canting said dog in the other direction free of gripping engagement with said rod when said rod is moved into said barrel whereby said rod and piston thereon may be withdrawn in said barrel free of said dog to allow filling of the barrel with caulking material.

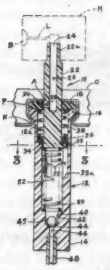
10. A piston and rod for the barrel of a caulking gun comprising:
a. a generally cylindrical body having first and second opposed end faces,
b. a rod,
c. said body having an axial hole through which said rod extends,
d. at least one ring groove formed in the periphery of said body and extending radially inwardly thereof,
e. a ring in said ring groove,
f. a multiplicity of spaced notches formed in said body at the periphery thereof extending radially inwardly of the body and longitudinally of the body from said first face and to a radial depth greater than that of said ring groove thereby allowing a fluid to enter said notches at said first face and pass through said recesses and under said rings to thereby allow said rings and said grooves to be cleaned by a fluid,
g. said second face having a domed surface,
h. a circular leather cup mounted on said domed surface.
i. means maintaining said leather cup in adjustable pressing engagement upon said domed surface for varying degrees of peripheral contact with the inner surface of the barrel.

3,997,086

PUMP FOR SPRAY DISPENSER AND THE LIKE

Joseph John Shay, Manchester, N.H., assignor to Summit Packaging Systems, Inc., Londonderry, N.H.

Filed Aug. 25, 1975, Ser. No. 607,251
Int. Cl.² B67D *5/42*
U.S. Cl. 222—385 **11 Claims**



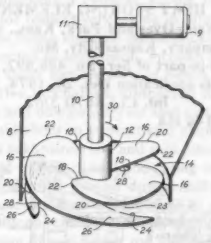
11. A pump-type dispensing container including a container, a tubular pump housing mounted in the mouth of the container, an annular resilient gasket closing the upper end of the housing, a plunger operative in the housing and passing through the gasket and sealingly engaging the gasket at least at the top of the stroke of the plunger, outlet passage means down through the plunger and having a port opening into the housing, the resilient gasket having a downward skirt about the opening therein and the plunger having an outward surface which at the top of the upstroke of the plunger urges the distal end of the skirt out into sealing engagement with the side wall of the housing in a sealing line, and vent means into the container is provided in the side wall of the housing above the sealing line to permit escape back into the container of liquid from the housing above the piston and to equalize pressure in the container with atmosphere.

3,997,087

CLOSING MECHANISMS FOR CONCRETE CONTAINERS

Kristian Stokbro Christensen, Ringsted, Denmark, assignor to Ringsted Jernstøberi & Maskinfabrik A/S, Ringsted, Denmark

Filed Feb. 26, 1975, Ser. No. 553,290
Claims priority, application Denmark, Mar. 1, 1974, 1092/74
Int. Cl.² B65G *65/46, 65/56*
U.S. Cl. 222—413 **11 Claims**



1. A closing mechanism for stopping and, respectively, controlled dispensing of concrete through a concrete dispensing outlet connected to a container for concrete, the outlet having inner walls defining an upright outlet passage having a circular contour, said closing mechanism comprising:
a controllably rotatable shaft; and
a feed worm including a hub operably connected to said shaft whereby said feed worm is rotated by said shaft in a direction of rotation;
said feed worm being adapted to be normally at least partially disposed in said outlet passage and comprises at least three threads which define an equal number of grooves;
each thread having an upper limitation and a lower limitation and being disposed about said hub and extending for an angular distance of from slightly greater than 360° divided by the number of threads to about 720° divided by the number of threads, said lower limitation of each thread thereby being overlapped by said upper limitation of the one of said threads that, in said direction of rotation, is behind the same; each said thread being normally extended radially from said hub with a peripheral edge portion conforming to the inner walls of the outlet to form substantially a seal with the inner walls against the flow of concrete while the feed worm is rotated and, respectively is at rest,
each said thread having throughout its angular distance, an angle of inclination of from about 8° to about 15° whereby the flow of concrete through said grooves will be normally restrained when the feed worm is not rotated, and controllable quantities of concrete will flow through the grooves when the feed worm is rotated; said upper limitation comprising a flat upper edge part extending

outwardly from said hub and forming an upwards open angle not exceeding 90° with the axis of said hub.

3,997,088

JET DEFLECTING AND ENERGY DISSIPATING POURING DEVICE

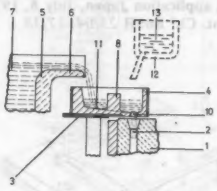
Erwin Bührer, Vogelingasschen 40, 8200 Schaffhausen; Switzerland

Continuation-in-part of Ser. No. 405,630, Oct. 11, 1973, abandoned, which is a continuation of Ser. No. 245,823, April 20, 1972, abandoned. This application Dec. 4, 1974, Ser. No. 529,479

Claims priority, application Switzerland, Apr. 21, 1971, 5827/71

Int. Cl.² B22D *37/00*

U.S. Cl. 222—461 **10 Claims**



1. A device for pouring a molten metal from a supply source into a mold comprising wall means forming a flowthrough member for receiving molten metal from the supply source and for flowing the molten metal into the mold, said wall means arranged to provide automatic emptying of the molten metal into the mold and defining kinetic energy dissipating means to provide a kinetic energy dissipating effect to the melt passing through the flowthrough member, said wall means forming an upwardly extending basin having a melt inlet at its upper end and a melt outlet at its lower end, and defining a nonlinear flowthrough path extending in a configuration which is continuously sloped in the flow direction from said inlet to said outlet, said melt outlet being offset laterally from said melt inlet and extending from the lowermost point of the basin with said kinetic energy dissipating means being located within said flowthrough member between said melt inlet and said melt outlet, and support means independent of the mold movably supporting said flowthrough member for displacing it between a first position supported on top of the mold and a second position spaced above the top of the mold, said support means being arranged to tilt said basin between the first and second position about a horizontal axis.

3,997,089

SEALING HOPPER CLOSURE ASSEMBLY

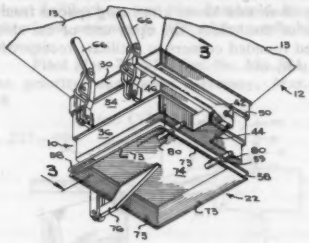
Edwin E. Clarke, Allentown, and Albert J. Florig, Norristown, both of Pa., assignors to Florig Equipment Company, Inc., Conshohocken, Pa.

Filed Mar. 24, 1975, Ser. No. 561,057

Int. Cl.² B60P *1/56*; **B61D** *7/18, 7/22, 7/26*

U.S. Cl. 222—545 **8 Claims**

1. A discharge gate assembly for use with a hopper containing particulate material having a discharge opening, said gate assembly comprising a frame having a vertical discharge passage therethrough, a valve means in the discharge passage for regulating the flow of material through the discharge passage, support means for removably connecting the frame to the hopper in a position covering the hopper discharge opening, a sealing means between the frame and the hopper for preventing the entry of contamination into the discharge opening, said support means including hinge means connecting the frame to the hopper and a latching means for securing the frame against and in sealing engagement with the sealing means, cover means for closing the discharge passageway to prevent, the entry of contamination into the discharge passageway, a flexible hopper liner which extends downwardly through the



discharge opening and is folded back against the outer surface of the hopper and retaining means for holding the hopper liner against the outer surface of the hopper.

3,997,090

DEVICE AND METHOD FOR FORMING A MORTAR JOINT PACKING BETWEEN A VESSEL OUTLET AND A REMOVABLE CLOSURE

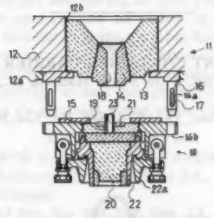
Bernhard Tinnes, Zollikerberg, Switzerland, assignor to Metacon A.G., Zurich, Switzerland

Filed July 8, 1975, Ser. No. 593,981

Claims priority, application Switzerland, July 12, 1974, 9622/74

Int. Cl.² B22D *41/08*

U.S. Cl. 222—590 **3 Claims**



1. In a device for closing the outlet bore of a vessel of the type used for containing molten metallic material where the device includes a movable closure member having a bore alignable with the outlet bore of the vessel and a plate member having a bore, said plate member having a surface that is bonded to said vessel with said bore of said plate member in alignment with said outlet bore, the improvement comprising a sheath member constructed from cardboard and impregnated with water glass material, said sheath member having one end inserted into said bore of said plate member and its other end inserted into said outlet bore of said vessel, said sheath member's material being consumable upon exposure to the molten material in said vessel.

3,997,091

HOSIERY DISPLAY APPARATUS

Phillip L. Burnette, High Point, N.C., assignor to Fleming-Potter Company, Inc., Peoria, Ill.

Filed Oct. 24, 1975, Ser. No. 625,571

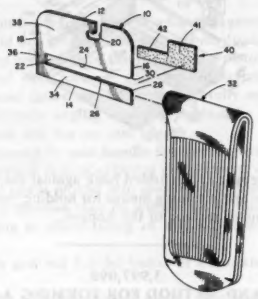
Int. Cl.² A41D *27/22*

U.S. Cl. 223—87 **2 Claims**

1. An improved hosiery holder device comprising, in combination:

a planar holder member including a top edge, a bottom edge, and opposed side edges, a hook member formed at

the top edge and a slot extending through one side edge toward the other side edge, and substantially parallel to the bottom edge to define a lower arm for receipt of a hosiery item, said lower arm being spaced from a main section of the holder, the open end of the slot having opposed rounded corners to facilitate receipt of hosiery in the slot; and



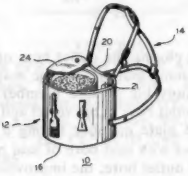
a flexible tape member attached to the holder member over the opposed rounded corners of the open slot for holding the hosiery item in the slot, said tape member having adhesive material on one side thereof with the adhesive surface folded over opposed sides of the planar holder member, and including an extension which projects over at least a portion of the remainder of the slot and adheres to hosiery in the slot to retain the hosiery in a substantially fixed, non-slip position.

3,997,092

PAINT CONTAINER CARRIER

Kenneth W. Pogwizd, 6730 South Madison St., Hinsdale, Ill. 60521

Filed Nov. 18, 1974, Ser. No. 524,382
Int. Cl.² B65D *21/00*
U.S. Cl. 224—5 A **5 Claims**



1. A paint container carrier for securing a paint container to the body of the user,

said carrier comprising a receptacle for holding the paint container having a contoured side substantially conforming to the user's body,

said paint container fitting into said receptacle and enclosed therein;

a strapping assembly means;

means for securing said strapping assembly means to said receptacle, so that the contoured side of said receptacle engages the body of the user,

said strapping assembly means comprising a top shoulder strap which is secured over the neck of the user,

a waist strap secured around the waist of the user;

and a back strap which braces said top shoulder strap to said waist strap at the back side of the user,

the inner dimension of said receptacle substantially equal in size to the container diameter of a standard paint container so that said standard paint container fits snugly therein,

sleeve means for adapting said receptacle to receive paint containers smaller in diameter than said inner dimension of said receptacle so that said smaller containers fits snugly therein, and

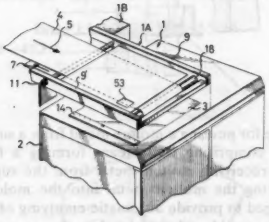
said paint container carrier having a lid across the top of said receptacle and means for securing said lid to said receptacle.

3,997,093

WEB FEED APPARATUS

Masahiro Aizawa, Tokyo; Toshiro Bando; Toshio Shiina, both of Yokohama; Nobuhito Sasaki, Tokyo, and Terunobu Onuma, Miyagi, all of Japan, assignors to Ricoh Co., Ltd., Japan

Filed July 8, 1975, Ser. No. 593,972
Claims priority, application Japan, July 8, 1974, 49-78075
Int. Cl.² B65H *25/04*, *17/38*
U.S. Cl. 226—11 **6 Claims**



6. A web feed apparatus comprising, in combination, a tension roller; conveyor frame means rotatably supporting said tension roller for shifting thereof longitudinally of said conveyor frame means, said conveyor frame means forming a path of movement for a web trained over said tension roller to reverse the direction of movement of the web; spring means biasing said tension roller longitudinally along said conveyor frame means in a direction to tension the web; the biasing force of said spring means being less than the force of gravity exerted on said tension roller; pivot means supporting one end of said conveyor frame means for pivoting of said conveyor frame means between a substantially horizontal operative position and a substantially vertical web setting position; said tension roller being mounted on said conveyor frame means adjacent the opposite free end of said conveyor frame means whereby, in the web setting position of said conveyor frame means, said tension roller is subjected to the force of gravity to move in a direction opposite to the direction in which said tension roller is biased by said springs means, whereby to decrease the tension on the web.

3,997,094

DEVICE FOR ALIGNING POWER PRESS FEEDSTOCK

Albert Orser Aylesworth, 3050 Alexander Blvd., Windsor, Ontario, Canada

Filed Mar. 10, 1976, Ser. No. 665,503
Int. Cl.² B65H *25/26*
U.S. Cl. 226—19 **14 Claims**

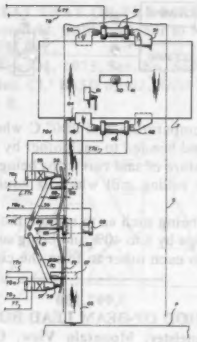
1. A device for feeding a coil of sheet material to a power press comprising:

a. a feeder for intermittently advancing predetermined lengths of said sheet material along a feed path, said feeder having a pair of powered gripping rollers for gripping and advancing said sheet material, said rollers being mounted on a head portion which is supported on a base with the feeder head being arranged to pivot on said base about a vertical axis and to move on said base laterally to the direction of travel of the sheet material while being

fixed against movement parallel to the direction of travel of the sheet material;

b. powered means for separately laterally moving forward and rearward portions of said feeder head, and

c. detector means mounted between the feeder head and power press for detecting the edge of the sheet material, including at least two detector means spaced longitudinally to the direction of travel of the sheet material and arranged to both detect the same edge of the sheet, said detector means being operatively connected to actuate said powered means for laterally moving said feeder head, whereby the feeder head laterally adjusts and/or pivots to maintain the sheet material in proper alignment within the power press feed path.



3,997,095

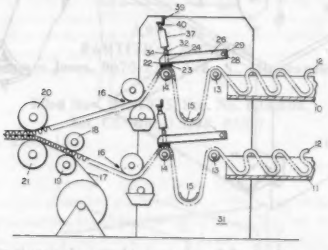
SINGLE FACE WEB WEAVE CONTROL

Francis M. Lamb, Fairmount, Ind., assignor to Owens-Illinois, Inc., Toledo, Ohio

Filed Mar. 5, 1976, Ser. No. 664,209

Int. Cl.² B65H *23/16*

U.S. Cl. 226—195 **9 Claims**



8. Web weave control for a corrugator bridge guide having an idler roll at its exit comprising:

an elongated plate positioned in overlying relationship to said idler roll of said bridge guide;

a pair of air cylinders connected between a fixed overhead support and the ends of said plate for raising and lowering said plate;

control means connected to said cylinders for operating said cylinders to raise or lower said plate; and

adjustable pressure regulator means in the feed to said cylinders for controlling the pressing force of said cylinders on the plate.

3,997,096

ARRANGEMENT FOR COOLING AN EXPLOSIVE CHARGE-DRIVEN SETTING GUN

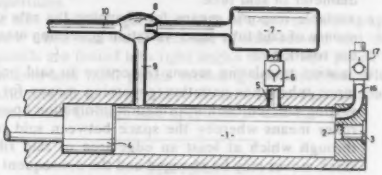
Peter Gloor, Zollikerberg, and Max Berchtold, Kusnacht, both of Switzerland, assignors to Hilti Aktiengesellschaft, Schaan, Liechtenstein

Filed Mar. 7, 1975, Ser. No. 556,384

Claims priority, application Germany, Mar. 8, 1974, 2411168

Int. Cl.² B25C *1/14*

U.S. Cl. 227—10 **6 Claims**



1. In an explosive charge-driven setting gun for driving fastening elements and the like into a receiving material comprising an axially extending piston guide chamber having a forward end and a rearward end spaced apart in the axial direction and a piston mounted in said guide chamber and having a rear end part guided by said chamber and arranged to be displaced in the axial direction from the rearward end to the forward end of the chamber by the action of the gases generated in the ignition of an explosive charge, wherein the improvement comprises at least one first opening from said guide chamber located between the positions of the rear end part of said piston in the rearward end and in the forward end in said guide chamber, a storage chamber located exteriorly of said guide chamber and having an inlet connected to said at least one first opening and an outlet, at least one second opening from said piston guide chamber located between said at least one first opening and the position of said rear end part of said piston in the forward end of said piston guide chamber, and means connected to said storage chamber for effecting a flow of cooling air into said piston guide chamber.

3,997,097

MEANS FOR FABRICATING TAPERED TUBING

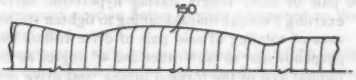
Lloyd Elliott Embury, 85, Edenbridge Rd., Islington, Ontario M9A-3G5, Canada

Continuation of Ser. No. 408,254, Oct. 23, 1973, abandoned, which is a continuation of Ser. No. 213,327, Dec. 29, 1971, abandoned, which is a continuation-in-part of Ser. No. 122,136, March 8, 1971, abandoned, which is a continuation of Ser. No. 738,381, Jan. 17, 1968, abandoned. This application June 19, 1975, Ser. No. 583,449

Claims priority, application United Kingdom, June 16, 1967, 27966/67

Int. Cl.² B23K *5/02*

U.S. Cl. 228—7 **15 Claims**



1. A machine adapted and designed for fabricating tapered tube from flat ribbon-stock, said tube being in the form of a chain of continuously connected complete 360° frusto-conical helical turns wherein adjacent turns are welded to each other substantially along their edges comprising in combination:-

i. roller means including ribbon-stock squeezing rollers, the width of the space between said rollers and between which said ribbon stock moves being changeable so that variable pressure is applied to said ribbon-stock, a longitudinal edge portion including an edge of said ribbon-stock being thereby reduced in thickness relative to the

opposite edge portion and said ribbon-stock thereby being curved in its general or overall plane before being wound into helical tube, and

ii. automatic means for programming the desired variable diameter of the said tube as it is being fabricated including:-

a. tube-taper variation-governing means responsive to rotation of said rollers while said tube is being fabricated.

b. diameter variation sensing means continuously responsive to feed-back information indicating change in the diameter of said tube.

c. variable response means for changing the rate of response of said tube-taper variation governing means to the rotation of

d. motion translating means responsive to said primary taper tube-taper variation governing means for converting said fed-back information into action upon said roller means whereby the space between said rollers through which at least an edge-area of said ribbon-stock moves may be changed and the consequent pressure upon said edge-area altered to vary the curvature of said ribbon-stock in its said plane.

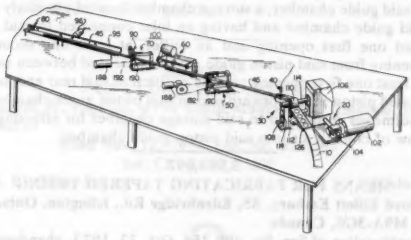
3,997,098
HELICALLY SEAMED TUBING AND APPARATUS AND METHOD FOR MAKING SAME

Louis B. Van Petten, Union Bridge, Md., assignor to Brunswick Corporation, Skokie, Ill.

Continuation-in-part of Ser. No. 465,176, April 29, 1974. This application Apr. 23, 1975, Ser. No. 568,771

Int. Cl.² B21C *37/083, 37/12*

U.S. Cl. 228—17.7 **10 Claims**



1. An apparatus forming metal tubing having helical welding seams from sheet material comprising:

means for forming a flange on both lateral edges of said sheet material;

means for guiding a trailing edge flange into abutment with a leading edge flange by engaging the inside of each flange,

means for welding said abutted flanges,

means for holding said welded edges in abutment until the weld sets, said holding means including

A pair of drive rollers having hyperbolic surfaces for exerting a torque on said tubing to tighten the helix, the axes of rotating of said pair of drive rollers beginning perpendicular to each other and 45 degree to the longitudinal axis of the formed tubing, and drive means for overdriving said pair of rollers to product said torque.

3,997,099
METHOD OF PRODUCING COMPOSITE MATERIAL FOR BEARINGS OR SLIDING MEMBERS

Nobukazu Morisaki, Aichi, Japan, assignor to Daido Metal Company, Ltd., Nagoya, Japan

Filed Feb. 4, 1975, Ser. No. 546,994

Claims priority, application Japan, Oct. 4, 1974, 49-114420

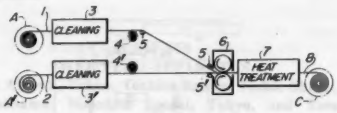
Int. Cl.² B23K *21/00*

U.S. Cl. 228—117 **14 Claims**

1. A method of producing composite material for bearings or sliding members, including

applying pressure, by rolling, simultaneously to a strip having a steel backing and a layer of copper-base alloy bonded to the face of said steel backing, and a strip of lead-base alloy with said copper-base alloy layer positioned between said steel backing and said lead-base alloy strip.

said two strips having a temperature in the range between



the room temperature and 200° C when said two strips are rolled and bonded to each other by pressure bonding, the temperature of said two strips being controlled by the rolls of the rolling mill which is equiped with cooling means,

said pressure being such as to reduce the total thickness of said two strips by 8 to 40% and being such as to bond said two strips to each other to form the composite material.

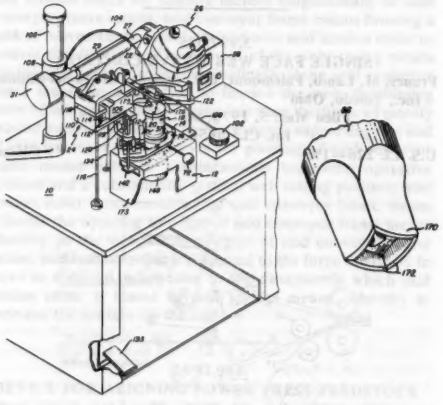
3,997,100
METHOD OF BEAM LEAD BONDING

Lucien A. Hofmeister, Mountain View, Calif., assignor to Raytheon Company, Lexington, Mass.

Continuation of Ser. No. 395,894, Sept. 10, 1973, abandoned, which is a division of Ser. No. 207,689, Dec. 13, 1971, abandoned, which is a continuation of Ser. No. 869,745, Oct. 27, 1969, abandoned. This application Jan. 13, 1975, Ser. No. 540,485

Int. Cl.² B23K *19/04*

U.S. Cl. 228—179 **9 Claims**



1. The method of forming an electrical circuit structure comprising the steps of:

forming an integrated circuit comprising a solid body of semiconductor material having a plurality of interconnected semiconductor elements and a plurality of deformable conductive leads connected to at least some of said elements and having regions extending outwardly from said body substantially parallel to a surface of said body and beyond the edges thereof;

positioning said regions of said deformable leads adjacent to regions of a plurality of conductive lines bonded to insulating regions of a solid support substrate, with said semiconductor body being supported on said substrate through said conductive leads; and

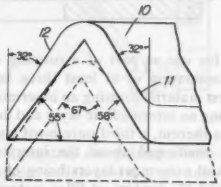
repetitively deforming, to form deformations, and bonding a plurality of each of said regions of each of said leads to said lines throughout a substantial extent of said regions of said leads and said lines in a time sequence in which the points of maximum deformation of said deformations are sequentially produced and spaced along the longitudinal axes of said leads.

3,997,101

MEAT TRAY OR THE LIKE

John Florian, Bakersfield, Calif., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Apr. 21, 1975, Ser. No. 569,917
Int. Cl.² B65D *85/62, 5/20*
U.S. Cl. 229—2.5 R 2 Claims



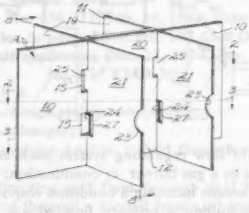
1. In a thermoformed tray of foamed thermoplastic resin for packing meat and the like having a rectangular planar bottom and side walls integral with said bottom and with each other extending upwardly and outwardly from the margin of said bottom; the improvement which comprises flanges integral with the upper margins of said side walls, which flanges extend outwardly and downwardly from said margin of said side walls and terminate at a level substantially in the plane of said bottom to provide a circumferential member about said tray having the cross-section form of an inverted V; said circumferential member being of greatest thickness of the region of junction of said side wall and said flange, at least one of said side wall and said flange being tapered to a lesser thickness away from said junction, whereby the angle between inner surfaces of said circumferential member is greater than the angle between outer surfaces thereof to provide essentially line contact between circumferential members of trays in a stack.

3,997,102

PARTITION MEMBER

Robert James Jones, 9670-13th Ave., S., Minneapolis, Minn. 55420

Filed Nov. 24, 1975, Ser. No. 634,604
Int. Cl.² B65D *5/48, 85/00*
U.S. Cl. 229—15 10 Claims



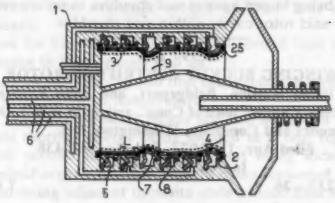
1. A partition including
a series of three generally rectangular panels of substantially equal sizes with one full length panel between the second and third panels,
parallel fold lines extending across the second and third panels dividing each of these panels into three sections of substantially equal size,
the fold lines in the first and third panels being contiguous,
a pair of spaced apertures in said first panel in the area outwardly of each of said fold lines in said second and third panels, and
tabs on said outer sections of said second and third panels formed by generally V-shaped cut lines in the intermediate section of said second and third panels and terminating adjoining said fold lines within the length of said apertures,
said tabs engaging against an edge of a corresponding aperture when said outer sections of said second and third panels are folded into right angles to said first panel, the second and third panels including apertures into which said tabs may extend where the tabs on the opposite panel are folded through said apertures in said first panel.

3,997,103

PATH OF CONVEYANCE WITH MEMBRANE

Martin Baram, Brondby Strand, Denmark, assignor to Escher Wyss Limited, Zurich, Switzerland

Filed Aug. 26, 1975, Ser. No. 607,830
Claims priority, application Switzerland, Sept. 2, 1974, 11887/74
Int. Cl.² B04B *1/00, 11/04*
U.S. Cl. 233—3 16 Claims



1. Apparatus including means defining a path of conveyance having a discharge end and along which material is transported, a pressure medium chamber located at the bottom of said path and extending transversely relatively to the direction of transport, and a membrane which covers the chamber and is arched by the pressure therein to thereby transport overlying material along a longitudinal section of said path, and characterized in that
a. said membrane comprises two portions having different flexibilities arranged in succession in the direction of conveyance,
b. the first portion being located downstream of the second, having a dimension in the direction of conveyance greater than one-half the length of said longitudinal section, being reinforced longitudinally so that it is relatively stiff, and having a flexible region at its downstream edge,
c. the second portion being flexible compared to the first portion; and
d. the apparatus includes a covering skin which bridges at least the flexible second portion of the membrane and thereby isolates same from the material being transported.

3,997,104

CENTRIFUGE ROTOR

George N. Hein, 331 Chesham Ave., San Carlos, Calif. 94070

Filed Apr. 9, 1975, Ser. No. 566,389
Int. Cl.² B04B *9/12*
U.S. Cl. 233—26 11 Claims

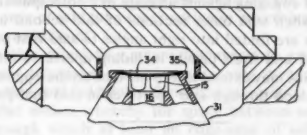
1. A rotor for a centrifuge apparatus comprising:
a rotor body symmetrically shaped about its axis of rotation;

at least one cavity formed in said rotor body having an inlet opening through the top of said rotor body;

means associated with said rotor body for cooperating with centrifuge driving means for rotating said rotor body about its axis for centrifuging a liquid sample in said cavity;

an annular shoulder formed around the top of said rotor and surrounding the opening to said cavity, said shoulder having an inward facing surface; and

a cover member in the form of a thin flexible disc having a diameter greater than that of said annular shoulder but



small enough to permit the edge of said disc to seat against said annular shoulder when force is applied to the center portion of said disc, said disc movable between a first concave position and a second concave position inward toward said rotor cavity and within said annular shoulder, said edge of said disc in said first concave position being slightly spaced from said shoulder to allow insertion and removal of said disc with respect to said rotor, said edge of said disc in said second concave position being biased against said shoulder to secure said disc over said rotor cavity within said shoulder.

3,997,105

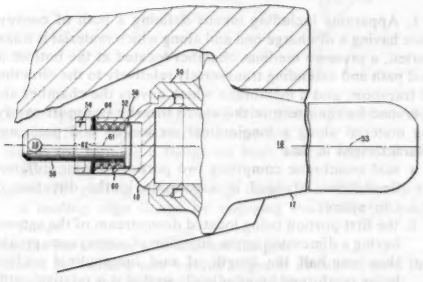
SWINGING BUCKET CENTRIFUGE ROTOR

Mark William Hayden, Bridgeport, and John Francis Williams, New Canaan, both of Conn., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Apr. 11, 1975, Ser. No. 567,438

Int. Cl.² B04B *9/12*

U.S. Cl. 233—26 **7 Claims**



1. In a centrifuge having a rotor which defines a plurality of peripheral cavities therein and is adapted to turn about its axis, each said cavity adapted to pivotally support a bucket therein nominally in a vertical orientation and yet permitting said bucket to swing under the influence of centrifugal force to a horizontal orientation during operation, the improvement comprising: a fixed hanger in each said cavity attached solely to said rotor, and

each said bucket having a detachable cup,

coupling means secured solely to each said cap for pivotally engaging said hanger,

said coupling means including spring means for biasing said cap and hence said bucket toward said hanger and hence radially inward toward said rotor axis when said bucket is in a horizontal orientation, whereby different weight sets of buckets may be used with said rotor simply by changing said spring means.

3,997,106

CENTRIFUGE ROTOR

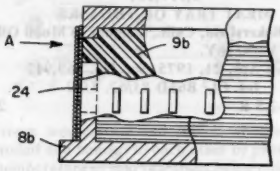
Martin Baram, Brondby Strand, Denmark, assignor to F. L. Smidth & Co., Cresskill, N.J.

Filed Nov. 14, 1974, Ser. No. 523,753

Claims priority, application Denmark, Nov. 20, 1973, 6250/73

Int. Cl.² B04B *1/00*

U.S. Cl. 233—27 **9 Claims**



1. A rotor for use as part of a rotating centrifuge which comprises a lamination of at least three layers of different materials, a first material forming an innermost filler, a second material forming an intermediate layer and defining a plurality of perforations therein, a third outermost layer in the form of wire material positioned about the intermediate layer, the intermediate and outermost layers being of greater mechanical strength than the innermost filler material and the innermost filler material being relatively chemically resistant, at least said outermost layer being prestressed to provide inwardly directed bias forces against the innermost filler material and portions of the innermost filler material being positioned within perforations defined by said intermediate layer and adhered to portions of the wire material of the outermost layer thereby providing a rotor of improved mechanical strength while the bias forces on the innermost layer counteract at least part of the operative centrifugal forces of the centrifuge rotor during rotation.

3,997,107

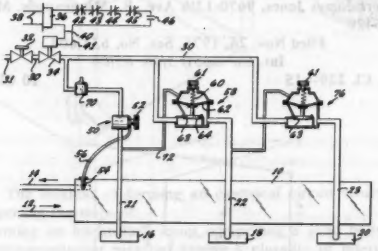
SERVO MODULATING REGULATING CONTROL SYSTEM

Leo Block, Westlake Village, and Larry J. Ashton, Thousand Oaks, both of Calif., assignors to Raypak, Inc., Westlake Village, Calif.

Continuation of Ser. No. 457,598, April 3, 1974, abandoned. This application Sept. 8, 1975, Ser. No. 611,077

Int. Cl.² F23Q *9/08*

U.S. Cl. 236—1 A **13 Claims**



1. In a fluid flow regulating system such as a system for supplying gas to a gas burner, in combination: burner means, flow control means incuding a condition responsive modulating valve controlling a primary flow of gas to the burner means; additional flow control means comprising a pressure regulator controlling a second parallel flow to the burner means, and means connecting the discharge pressure from the modulating valve to the regulator to provide a biasing influence whereby said pressure regulator is modulated in response

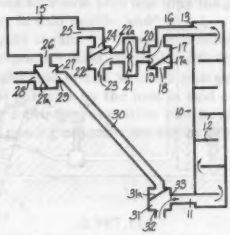
to said pressure thereby acting as a slave to the modulating valve.

3,997,108

AUTOMATIC AIR FLOW CONTROL

George F. Mason, 9 Gene St., East Haven, Conn. 06512

Filed June 23, 1975, Ser. No. 589,250
Int. Cl.² F24J 3/02
U.S. Cl. 237—1 A 6 Claims



1. A solar heating system comprising a collector having an inlet end and an outlet end, a heat storage unit having an inlet end and an outlet end, a space to be heated, air ducts interconnecting in series in a closed system said collector and storage unit and air ducts connecting parts of said system to said space, a fan operatively associated with said first named ducts downstream of the collector, a plurality of dampers in series in said system each adjustable to alternative positions for establishing a desired air flow circuit, and an electrical operating circuit for controlling automatically the adjustment of the dampers and operation of the fan, a first damper being located between the outlet end of the collector and inlet end of the storage unit and being adjustable to connect the outlet end of the collector alternatively to the inlet end of the storage unit or to the space to be heated, a second damper being located between the outlet end of the storage unit and inlet end of the collector and being adjustable to connect the inlet end of the collector alternatively to the storage unit or to the space to be heated, third and fourth dampers being located at opposite ends of the storage unit and adjustable to connect both ends of the storage unit with the space to be heated, the electrical circuit including thermostats in the collector, storage unit and space to be heated, and said electrical circuit being adapted to actuate dampers and the fan to cause warm air to be supplied to said space on demand of the thermostat therein when either other thermostat indicates that warm air is available from the collector or from the storage unit.

3,997,109

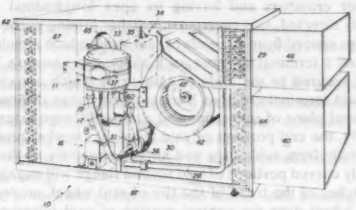
HEAT EXCHANGE CONTROL SYSTEM

Herbert G. Hays, Homestead, Iowa, assignor to Amana Refrigeration, Inc., Amana, Iowa

Division of Ser. No. 436,231, Jan. 24, 1974, abandoned, which is a continuation-in-part of Ser. No. 185,631, Oct. 1, 1971, abandoned. This application Dec. 23, 1974, Ser. No. 535,382
Int. Cl.² F24D 3/02
U.S. Cl. 237—8 R 6 Claims

1. A heat exchange system comprising:
a first heat exchanger;
means for supplying heat to a fluid through said first heat exchanger;
means for directing said fluid through said first heat exchanger and through a second heat exchanger;
means for blowing air through said second heat exchanger to extract heat therefrom;
means for varying the amount of heat supplied to said first heat exchanger;
means for changing the amount of air blown through said second heat exchanger to maintain said first heat exchanger above a predetermined temperature;
said means for supplying heat to said first heat exchanger comprising a burner for producing said heat from the products of combustion positioned in a plenum in said first heat exchanger; and
the circulation of said fluid through said first heat exchanger being delayed for a predetermined period after said products of combustion are supplied to said first heat exchanger.

3. A heat exchange system comprising:
a first heat exchange means;
a second heat exchange means;
means for transferring thermal energy from said first heat exchange means to said second heat exchange means comprising means for pumping thermal energy from said



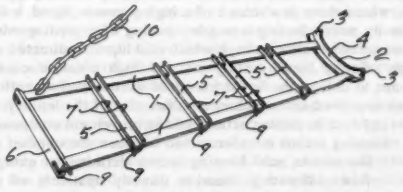
second heat exchange means to third heat exchange means;
means for blowing air through said second heat exchange means to heat or cool said air;
means for maintaining said first heat exchange means above a predetermined temperature;
said first heat exchange means and said means for pumping said thermal energy being located in a first region and said second heat exchange means being located in a second region, with said regions being separated by a wall and being adjacent opposite ends of said heat exchange system; and
said thermal energy being transferred from said first heat exchange means to said second heat exchange means a predetermined time after thermal energy is supplied to said first heat exchange means from the products of combustion.

3,997,110

ANTI-SLIPPING ACCESSORY FOR TRACTION WHEEL

Yves Aumont, 5243-4th Ave., Rosemont, Quebec H1Y 2V4, Canada

Filed Apr. 28, 1975, Ser. No. 571,914
Claims priority, application Canada, May 27, 1974, 200912
Int. Cl.² E01B 23/00
U.S. Cl. 238—14 1 Claim



1. As an anti-slipping accessory for engaging between a powered tire wheel of a vehicle and a supporting surface, comprising a pair of converging flat bendable strips having an

upper face and an underface, a plurality of rigid elongated straight parallel crossbars, each of V-shape cross-section, having an apex longitudinal edge and a pair of diverging wings, and further including a pair of parallel longitudinal flanges extending from the free edges of said wings, said crossbars secured at both ends to the respective strips, substantially equally spaced from one another along said strips, both ends of each crossbar having a slit opening at said end and extending towards the other end of the crossbars, said strip inserted within said slits, pointed cleats secured to all intersecting portions of said crossbars and strips and securing said crossbars to said strips, said cleats projecting from the underface of said strips and of said crossbars to penetrate the supporting surface, said crossbars including an outermost crossbar joining the ends of said strips which are farthest apart and an innermost crossbar, all of said crossbars, except said outermost crossbar, having their apex longitudinal edge downwardly directed, said outermost crossbar being reversed relative to the other crossbars and having its apex longitudinal edge upwardly directed, said innermost crossbar joining portions of said strips spaced from the ends of said strips which are closest apart, and a terminal crossbar, of L-shape cross-section, joining and secured to the ends of said strips which are closest apart, said terminal crossbar having a first flange disposed in the general plane of said strips and a second flange extending upwardly, the end portions of said terminal crossbar protruding laterally from said strips and curved upwardly so that the upwardly curved portions of said second flange will engage the side notches of the tread of the tire of said wheel, movement of said wheel over the central portion of said intermediate crossbars causing their apex longitudinal edges and the associated cleats to engage said supporting surface, the unevenness of said surface being allowed for by the bending of said bendable strips.

3,997,111

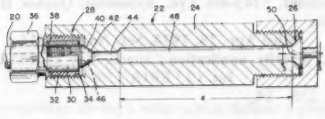
LIQUID JET CUTTING APPARATUS AND METHOD

Benjamin A. Thomas, Burton, and Edward W. Geller, Mercer Island, both of Wash., assignors to Flow Research, Inc., Kent, Wash.

Continuation-in-part of Ser. No. 597,508, July 21, 1975, abandoned, which is a continuation of Ser. No. 511,486, Oct. 2, 1974, abandoned. This application Sept. 22, 1975, Ser. No. 615,560

Int. Cl.² B05B *1/10;* **E21C** *25/60, 37/06*

U.S. Cl. 239—1 **14 Claims**



1. In a high velocity, constant flow, liquid jet cutting apparatus, where there is a source of a high pressure liquid, a high velocity nozzle having a nozzle opening of a predetermined cross sectional area through which said liquid is directed as a high velocity liquid cutting jet, and high pressure conduit means to deliver the liquid from said source to the nozzle,

an improvement to enhance collimation of the liquid jet to improve its cutting action, said improvement comprising:

housing means interconnected between the conduit and the nozzle, said housing means defining an elongate flow collimating chamber directly upstream of said nozzle to receive the liquid from the conduit means and deliver the liquid to the nozzle, said chamber having a cross sectional area greater than 100 times that of the nozzle opening.

3,997,112

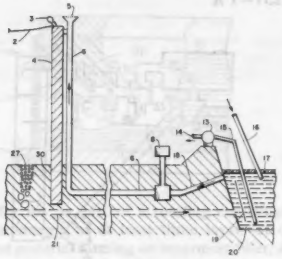
YEAR ROUND COOLING WATER FROM THE COLD WEATHER OF WINTER

John C. St. Clair, Box 216, R.R. 5, London, Ohio 43140

Continuation of Ser. No. 446,489, Feb. 27, 1974, abandoned. This application July 18, 1975, Ser. No. 597,016

Int. Cl.² B05B *17/04;* **A01G** *25/00;* **F25D** *1/02*

U.S. Cl. 239—13 **1 Claim**



1. A method for obtaining cold water for cooling purposes during the summer months which comprises: erecting a tower in a farmer's field, spraying water to be cooled from the tower during the winter months and storing the cold water thus produced in a plastic film covered lake, using this cold water for cooling purposes during the summer time, replacing the cold water that has been heated by said cooling purposes at a higher elevation in the lake than from where it was removed from the lake, again spraying in the winter this last mentioned water from a tower in a farmer's field and thus cooling it again, and during the summer months spraying water from an above mentioned tower in a farmer's field to irrigate a farmer's field.

3,997,113

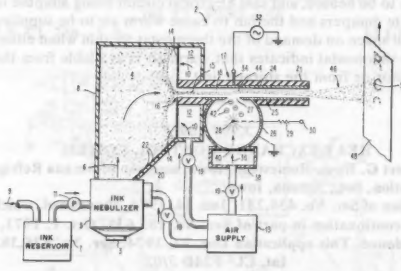
HIGH FREQUENCY ALTERNATING FIELD CHARGING OF AEROSOLS

William Boone Pennebaker, Jr., Carmel, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 31, 1975, Ser. No. 645,854

Int. Cl.² B05B *5/08*

U.S. Cl. 239—15 **8 Claims**



1. Apparatus for charging aerosol particles and for substantially eliminating precipitation of charged aerosol particles on the charging electrode comprising in combination:

an aerosol generating means for producing aerosol particles;

a chamber attached to said aerosol generating means for receiving said aerosol particles;

a nozzle connected to said chamber and spaced from said aerosol generating means, said nozzle protruding into said chamber and forming a passageway for said aerosol particles;

conductive means affixed to the inner surfaces of said nozzle for providing a charging region along the length of said passageway;

a corona housing connected to the lower side of said nozzle and containing therein a corona wire electrode for producing ions, said corona housing opening into said nozzle for providing ions to said charging region;

a high frequency A. C. generator opposite said opening in said corona source for producing a charging field in the region surrounded by said conductive means;

an air flow entering the chamber for compressing the aerosol to a cross-sectional area less than the diameter of said passageway in said nozzle; and

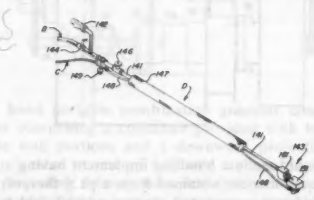
an air transport means for forming a continuous air flow carrier stream for said aerosol particles through said chamber and said nozzle where a charge is imparted to the aerosol particles by the ions in said charging field in order that a printing operation can be performed on a document passing adjacent the outlet of said nozzle.

3,997,114

HIGH PRESSURE SPRAY CLEANING APPARATUS

Charley L. Hewett, Northglenn, Colo., assignor to Kem-O-Kleen, Inc., Englewood, Colo.

Filed Apr. 3, 1975, Ser. No. 564,858
Int. Cl.² B05B 7/08
U.S. Cl. 239—127 19 Claims



1. In apparatus for spray cleaning a surface, the combination comprising:

spray head means for mixing and distributing a cleaning chemical fluid and a carrier fluid, said spray head means including a distributor body of a cleaning chemical corrosion resistant material having a top surface with a discharge aperture therein through which a jet of cleaning chemical fluid is emitted and a front surface normal to said top surface, said top and front surfaces meeting at a deflecting edge and a spray nozzle having a tip located to the rear of and above said distribution body and said discharge aperture adjacent the top surface for producing a substantially horizontal, flat, fan-like spray pattern of carrier fluid and directing said spray pattern downwardly at a slight angle to said top surface toward and against said deflecting edge;

cleaning chemical fluid supply means including a cleaning chemical flow circuit for delivering a cleaning chemical fluid under a selected pressure to and through said discharge aperture; and

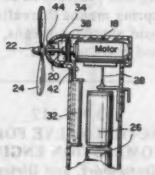
carrier fluid supply means including a carrier fluid flow circuit separate from said cleaning chemical flow circuit for delivering a heated carrier fluid at a substantial selected pressure to said spray nozzle whereby the cleaning chemical fluid is emitted into the spray pattern of said carrier fluid prior to the carrier fluid striking the deflecting edge and the cleaning chemical fluid and carrier fluid mixture are deflected from the deflecting edge as a fine spray of said mixture.

3,997,115

PORTABLE ATOMIZER FOR LIQUIDS

Mariano B. Licudine, Pompano Beach, Fla., assignor to Lawrence Peska Associates, Inc., New York, N.Y., a part interest

Filed Mar. 10, 1976, Ser. No. 665,524
Int. Cl.² B05B 3/08
U.S. Cl. 239—351 5 Claims



1. A portable atomizer for liquids comprising:

a hollow housing having a discharge aperture therein;

a battery positioned within said housing;

a motor mounted within said housing operably connected to said battery and having a rotatable shaft thereon;

a bladed fan carried by said motor shaft externally of said housing for rotation with said shaft;

a receptacle for the storage of liquids mounted within said housing;

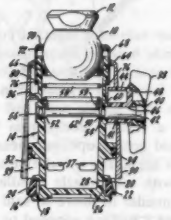
and a vacuum pump mounted within said housing operatively connected to said receptacle and drivable cyclically by said motor to pump measured quantities of liquid from said receptacle for discharge from said housing through said discharge aperture into the rotational path of said bladed fan.

3,997,116

ADJUSTABLE SHOWER HEAD

Alfred M. Moen, Grafton, Ohio, assignor to Stanadyne, Inc., Elyria, Ohio

Filed Oct. 28, 1975, Ser. No. 626,034
Int. Cl.² B05B 1/18
U.S. Cl. 239—460 8 Claims



1. In an adjustable shower head, an elongated generally tubular body member, a sleeve movably mounted on the exterior of said body member, a spray forming member attached to the downstream end of said body member, water discharge openings in said body member upstream of said spray forming member, the interior of said sleeve being variably positionable relative to the exterior of said spray forming member to vary the discharge therefrom,

a ball member at the upstream end of said body member, and means for pivotally and releasably attaching said body member to said ball member including a retainer, a ring carried by said retainer and having an inner diameter less than the diameter of said ball member and bearing thereagainst, said retainer having a pair of oppositely positioned projections on the interior thereof, a pair of cooperating oppositely positioned grooves on the exterior of said body member, spring means positioned in said

body member and biased against said body member and ball member, circumferential shoulder means on the exterior of said body member and axially spaced from the terminus of the axially extending grooves on the exterior of said body member, axial relative movement between said retainer and body member causing said retainer projections to move in said axial grooves, with subsequent rotary relative movement between said retainer and body member causing said projections to move away from said grooves, said spring means thereafter urging said projections against said shoulder means, thereby interlocking said retainer and body member.

3,997,117

FUEL INJECTION VALVE FOR INTERNAL COMBUSTION ENGINES

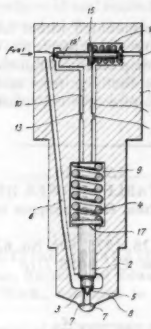
Wolfgang Köhler, Dusseldorf, and Dieter Schlundt, Bensberg-Frankenforst, both of Germany, assignors to Klockner-Humboldt-Deutz Aktiengesellschaft, Cologne, Germany

Filed Jan. 6, 1976, Ser. No. 646,752

Claims priority, application Germany, Jan. 9, 1975, 2500644

Int. Cl.² B05B *1/30*

U.S. Cl. 239—533.8 **7 Claims**



1. A fuel injection valve for internal combustion engines, which includes: nozzle housing means having nozzle opening means and a nozzle seat, a nozzle needle having a conical tip and being movable from a first position in which said nozzle needle tip rests on said nozzle seat and closes said nozzle opening means to a second position in which said nozzle needle tip opens said nozzle opening means, and vice versa, said housing means including a buffer chamber, first spring means associated with said nozzle needle and continuously urging said nozzle needle to move to said first position, said nozzle needle having a surface adapted to be exposed to fuel under pressure for moving said nozzle needle against the thrust of said first spring means from said first position to said second position, a fuel pressure line connectable to a fuel injection pump and adapted to convey fuel under pressure to said nozzle surface for moving said nozzle needle to said second position, first conduit means connecting said fuel pressure line with said buffer chamber, first throttle means interposed in said first conduit means, a fuel leakage line, reversing valve means interposed between said fuel pressure line and said fuel leakage line, second conduit means communicating with said buffer chamber and said reversing valve means, and second throttle means interposed in said second conduit means, said reversing valve including a control member movable to control communication between said first conduit means and said fuel pressure line and also communication between said second conduit means and said leakage fuel line, and second spring means associated with said reversing valve means and continuously urging said control member into a first control position in which communication between said fuel pressure line and said first conduit means is interrupted and communication between said second conduit means and said leakage fuel line is established, said control member being operable in response to the fuel pressure in said fuel pressure line overcoming the thrust of said second spring means to establish communication between said fuel pressure line and said first conduit means while interrupting communication between said second conduit means and said leakage fuel line.

3,997,118

LIQUID MANURE HANDLING MACHINE

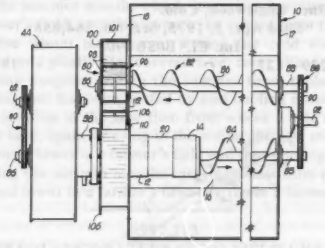
Thomas A. Bedwell, Providence, and Bruce L. Call, Logan, both of Utah, assignors to Hesston Corporation, Hesston, a...

Continuation-in-part of Ser. No. 426,632, Dec. 12, 1973, Pat. No. 3,889,066. This application Aug. 1, 1975, Ser. No. 601,324

The portion of the term of this patent subsequent to Aug. 12, 1992, has been disclaimed.

Int. Cl.² A01C *3/06*

U.S. Cl. 239—651 **8 Claims**



1. In a liquid manure handling implement having a holding tank for liquid manure obtained from a pool thereof:

a pickup housing mounted on one end of said tank and adapted for insertion into said pool,

said housing having an intake for manure from the pool and said tank having structure on said one end defining an inlet for picked-up manure from the housing;

an agitator-loader device on said housing adjacent said intake for aggressively churning the pool to thoroughly admix all levels thereof and for concurrently drawing the agitated manure through the housing toward said inlet when the device is actuated,

said housing being retractable from a lowered, loading position to a raised, transport position,

said tank having an outlet on said one end of unloading stored manure from the tank;

a conveyor unit within said tank for conveying manure away from said inlet and toward said outlet; and

spreader mechanism mounted on said one end of the tank exteriorly thereof adjacent said outlet fordistributing manure from the tank evenly over a field.

5. In a liquid manure handling implement:

a holding tank having a bottom and a rear end and provided with an inlet and an outlet;

a spreader mounted on said rear end of said tank exteriorly thereof for distributing manure from said tank evenly across a field;

a pickup mounted on said rear end and extending rearwardly beyond said spreader, said pickup being adapted for loading manure into said tank through said inlet; and

a conveyor unit within said tank adjacent said bottom for concurrently drawing manure away from said inlet and moving manure toward said outlet,

said conveyor unit having means for creating countermov-

ing streams of manure within said tank to thoroughly agitate the manure as the same is conveyed by said unit.

3,997,119

DEVICE FOR SPREADING GRANULES

Jan Oosterhof, Weesp, Netherlands, assignor to U.S. Philips Corporation, Briarcliff Manor, N.Y.

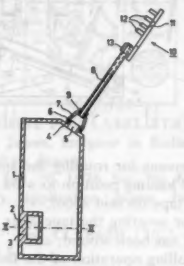
Continuation of Ser. No. 385,648, Aug. 6, 1973, abandoned. This application Nov. 4, 1974, Ser. No. 520,534

Claims priority, application Netherlands, July 7, 1972, 7209463

Disclosure was also published under second Trial Voluntary Protest Program on Feb. 17, 1976

Int. Cl.[2] A01C *7/02*

U.S. Cl. 239—652 3 Claims



1. A hand portable combination granular container and spreader comprising a container provided with bottom, top and side wall portions and a downward projecting tubular member located at one of said side wall portions, a downwardly projecting delivery tube detachably coupled into said tubular member and a granule distributer adjustably attached to the end of said delivery tube, said distributer comprising a substantially flat plate having a major axis substantially parallel to the axis of said delivery tube and provided on the surface of said plate adjacent to the opening of said delivery tube, with a multiplicity of protrusions extending in a direction substantially perpendicular to said surface.

3,997,120

MILL FOR GRINDING VEGETABLE PRODUCTS

Raymond Zimmer, 14, rue du Chateau, Horbourg (Bas-Rhin), France

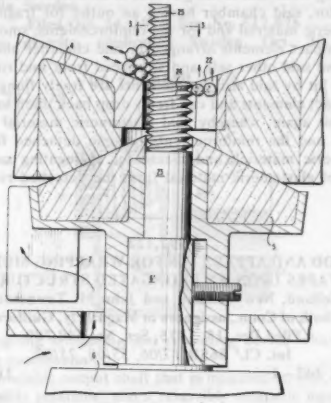
Continuation-in-part of Ser. No. 388,924, Aug. 16, 1973, Pat. No. 3,921,919. This application Nov. 17, 1975, Ser. No. 632,714

Claims priority, application France, Aug. 31, 1972, 72.31644

Int. Cl.[2] B02C *9/00*

U.S. Cl. 241—56 6 Claims

1. A mill for the production of meslins and flours, comprising a fixed annular upper millstone and a rotatable lower millstone, said millstones having a common vertical axis, motor means to rotate said lower millstone about said axis, and a screw conveyor fixed coaxially to said lower millstone and extending upwardly through the central opening of said annular upper millstone but spaced from a side wall of said opening a distance sufficient to define with said side wall a vertical channel through which vegetable products fall by gravity to the nip between said millstones, said motor turning



said lower millstone in a direction to cause said screw conveyor to feed upwardly.

3,997,121

APPARATUS FOR FRAGMENTING AUTOMOBILE TIRES

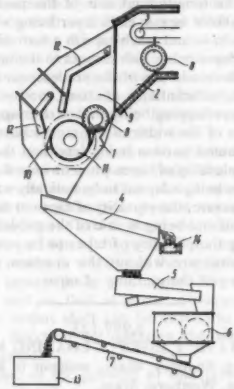
Herbert Motek, Altenberge, Germany, assignor to Hazemag Dr. E. Andreas KG, Munster, Germany

Filed June 5, 1974, Ser. No. 476,705

Claims priority, application Germany, June 7, 1973, 2329017

Int. Cl.[2] B02C *23/10*

U.S. Cl. 241—78 5 Claims



1. In an apparatus for fragmenting automobile tires and analogous articles of elastomeric material such as rubber or synthetic plastic material which have been frozen to make them brittle, so as to separate their material from embedded reinforcements of textile or other substances, a combination comprising an impact mill with a rotor mounted for rotation about a horizontal axis and having a plurality of circumferentially spaced smooth-surfaced striking elements which move about said axis in an orbital path having an apex to which said striking elements move upwardly from below at one side of said axis, and from which they move downwardly at the other side of said axis; feeding means for gravity feeding articles to be fragmented in a downward direction, to be hit by said

striking elements at said one side and in the region of said apex; a housing surrounding said rotor and forming a chamber extending from said feeding means in direction of rotation of said rotor, said chamber having an outlet for fragments of elastomeric material and for the reinforcements; smooth-surfaced impact elements arranged in said chamber above said rotor and said other side and so spaced from said rotor that articles hit by said striking elements are freely flung against the impact elements and can freely drop back upon said rotor to be hit again, whereby said elastomeric material is fragmented and the reinforcements become detached from the elastomeric material; and means for segregating said fragments of elastomeric material from the detached reinforcements.

3,997,122

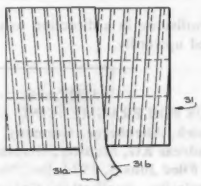
METHOD AND APPARATUS FOR WRAPPING MULTIPLE TAPES UPON AN ELONGATED STRUCTURE

Leon Helfand, New Canaan, and John M. Townsend, Branford, both of Conn., assignors to Magna Ply, Guilford, Conn.

Filed Dec. 15, 1975, Ser. No. 640,700

Int. Cl.² B65H *17/06, 55/00, 75/00*

U.S. Cl. 242—1 **21 Claims**



1. A supply package for tape material to be helically wrapped about a length of a structure comprising a plurality of different tapes of substantially equal length, traverse wound in turns about the longitudinal axis of the package to form a plurality of tubular layers, each layer being wound about the layer previously wound, each tape in a turn of the plurality of tapes in each layer being with respect to the tape of the plurality adjacent thereto in one of the predetermined conditions of spaced apart, substantially abutting, and overlapping, the condition of overlapping being that of overlapping a predetermined portion of the width of the tape adjacent thereto with the predetermined portion being less than the total width of the tape, the plurality of tapes when unwound from each layer of the package being adapted to be helically wrapped about an elongated structure, the plurality of tapes in response to being traverse wound and being in one of the predetermined conditions enabling the plurality of tapes to be wrapped around a length of a structure without the creation of a surplus or shortage in any of the plurality of tapes.

3,997,123

AUTOMATIC CASSETTE LOADING MACHINE

James L. King, Sudbury, Mass., assignor to King Instrument Corporation, Westboro, Mass.

Filed Dec. 23, 1974, Ser. No. 535,448

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 16, 1976

Int. Cl.² B65H *19/20*

U.S. Cl. 242—56 R **38 Claims**

1. An apparatus for automatically loading a plurality of cassettes having at least one rotatable spool and a leader attached to said spool with a predetermined length of tape comprising in combination:

cassette holding means for releasably holding a cassette to be loaded in a predetermined loading position;

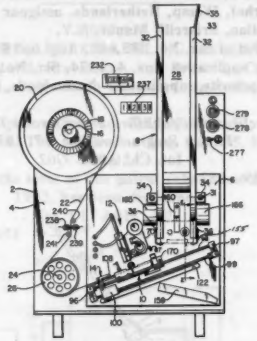
means for storing a plurality of cassettes to be loaded and for advancing them one at a time to said loading position;

means for feeding a supply of tape to be loaded;

a splicing block means spaced from said loading position for supporting the leading end of the tape to be loaded and the leader of a cassette located at said loading position;

reciprocally movable leader extractor means for withdrawing the leader from a cassette located at said loading position and positioning said leader on said splicing block means;

splicing means for splicing the leading end of said tape to one section of the leader positioned on said splicing block means;



rotatable drive means for rotating the spool of a cassette located at said loading position to wind a predetermined length of said tape on said spool;

cutting means for severing the tape after a predetermined length thereof has been wound; and

means for controlling operation of the foregoing means to effectuate the sequential loading of a plurality of cassettes.

3,997,124

CORE HOLDING DEVICE FOR LABEL STRIP

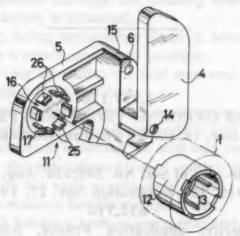
Yo Sato, Tokyo, Japan, assignor to Kabushiki Kaisha Sato Kenkyusho, Tokyo, Japan

Filed Apr. 12, 1976, Ser. No. 675,825

Claims priority, application Japan, Apr. 12, 1975, 50-048862[U]

Int. Cl.² B65H *17/02*

U.S. Cl. 242—68 **8 Claims**



1. A holding device for rotatably holding a core on which a label strip is wound, said device comprising:

a core holding member for removably receiving and for securely holding said core such that said core and said holding member rotate together;

a mounting bracket to which said core holding member is mounted and with respect to which it is rotatable;

braking means interposed between said mounting bracket and said core holding member for imparting a predetermined braking force to the rotation of said core holding

member, whereby the label strip can be prevented from getting slack while it is being fed;

a label strip looseness preventing bracket for preventing the label strip from coming loose from said core; means for connecting said brackets to be relatively pivotable with respect to each other between a first position, where they are angularly spaced from each other to provide easy access into the space between them, and a second position where they are in angular registration; said looseness preventing bracket being shaped so as to extend past said core holding member when said brackets are in their said second position; said looseness preventing bracket being spaced from said mounting bracket a distance such that with a core mounted to said core holding member and said brackets being in said second position, said looseness preventing bracket passes near to and beyond the end of the core as it extends past the core.

3,997,125

CORE FOR LABEL STRIP

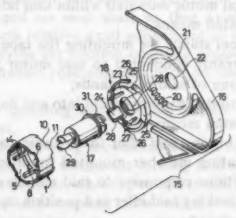
Yo Sato, Tokyo, Japan, assignor to Kabushiki Kaisha Sato Kenkyusho, Tokyo, Japan

Filed Jan. 20, 1976, Ser. No. 650,622

Claims priority, application Japan, Jan. 28, 1975, 50-11980[U]

Int. Cl.² B65H *17/02*

U.S. Cl. 242—68.5 **12 Claims**



1. A core for a label strip, said core comprising:

a hollow cylindrical body, including:

an outer cylindrical surface on which a label strip is to be rolled; said cylindrical body and cylindrical surface having a common axis;

a first end face at one end of said cylindrical body and oriented perpendicular to said axis and facing outwardly of said cylindrical body; said first end face having a relatively wider radial width;

a second end face at the opposite end of said cylindrical body and oriented perpendicular to said axis and facing outwardly of said cylindrical body; said second end face having a relatively narrower radial width;

a fitting surface inside said cylindrical body and facing in the opposite direction from and spaced from said first end face;

an inner bore in and defined by the interior of said cylindrical body and extending between said first end face and said fitting surface;

said cylindrical body having an interior surface between said second end face and said fitting surface; said inner bore having a diameter that is smaller than the diameter of said cylindrical body interior surface; said bore being coaxial with said cylindrical body.

3,997,126

SPRING OPERATED, REVERSIBLY ROTATABLE BODY

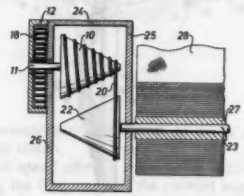
Hans Ingemar Reimertz Karlsson, Vintervagen 17, 175 40 Jarfalla, Sweden

Filed Oct. 24, 1974, Ser. No. 517,676

Claims priority, application Sweden, Oct. 30, 1973, 7314694

Int. Cl.² B65H *75/48*

U.S. Cl. 242—107 **11 Claims**



1. A spring tensioning and rewinding device which comprises in combination:

a. a rotatable output shaft that is mounted so that it is reversibly rotatable, and a reversibly rotatable input shaft mounted parallel to said rotatable output shaft,

b. an elongated flexible member disposed concentrically around said rotatable output shaft so that when said rotatable output shaft is rotated in one direction said flexible member is in a wound condition and when said rotatable output shaft is rotated in the opposite direction said flexible member is in an unwound condition,

c. a spring member mounted on said reversibly rotatable input shaft, said spring member being arranged to be stretched by the rotation of said output shaft during the unwinding of said elongated flexible member from said output shaft,

d. means interconnecting said rotatable input shaft with one end of said rotatable output shaft, said means including

1. a first tapered body having a base portion and a top mounted on said rotatable output shaft, said first tapered body being drivingly connected to said rotatable output shaft in both directions of rotation,

2. a second tapered body having a base portion and a top mounted on said rotatable input shaft, the taper of said second tapered body being disposed opposite to the taper of said first tapered body and

3. a traction wire having one end attached to said base portion of said first tapered body, the other end attached to said base portion of said second tappered body, and the intermediate portion wound around the exterior surfaces of said first and second tapered bodies so that the rotation of the rotatable output shaft in one direction results in winding of the traction wire around said first tapered body and a tensioning of said spring member and so that at some subsequent time said rotatable output shaft can be caused to rotate in the opposite direction by releasing the tension of said spring member,

whereby the slope of the genatrix of said tapered bodies is such that the tractive force required to unwind said flexible member from said rotatable output shaft will decrease over the course of said unwinding.

3,997,127

WIRE PAY-OFF CAP ASSEMBLY

Joseph J. Kovaleski, c/o Wyrepak Ind., Inc., 136 James St., Bridgeport, Conn. 06604

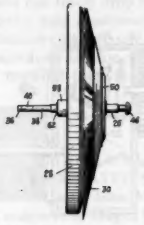
Filed Oct. 14, 1975, Ser. No. 622,025

Int. Cl.² B65H *49/00*

U.S. Cl. 242—128 **12 Claims**

1. A wire pay-off cap assembly for use with wire-filled spools to control the unreeling of wire past the ends thereof, comprising in combination:

a. a wheel having a rim adapted for engagement with the wire being unreeled,
b. a circular brush disposed broadside to the wheel, having tines extending past the wheel periphery,
c. a support member rotatably mounting said wheel and fixedly mounting said brush in their respective operative positions,



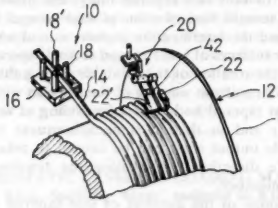
d. said member having a radially movable friction-locking part shiftable between gripping and releasing positions and receivable in a cavity at the end of a wire-filled spool to frictionally lock said assembly to the cavity walls with the wheel broadside to the spool end, and
e. manually operable means carried by the support member, for actuating said radially movable part between said gripping and releasing positions whereby the assembly can be quickly secured at and removed from said spool.

3,997,128

WIRE TAKE UP APPARATUS

Ryoichi Hara, and Masamichi Yajima, both of Ichihara, Japan, assignors to The Furukawa Electric Co., Ltd., Tokyo, Japan

Filed Dec. 10, 1975, Ser. No. 639,361
Claims priority, application Japan, Apr. 8, 1975, 50-41871; Aug. 14, 1975, 50-98134; Dec. 18, 1974, 49-152540[U]
Int. Cl.² B65H *54/28*
U.S. Cl. 242—158.4 R **11 Claims**



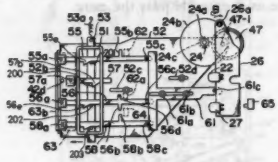
1. A wire take up apparatus comprising a distributor to distribute a wire to be taken up on a reel along the axis of said reel, and wire raising up detecting means to electrically detect that a first turn of a new winding layer of said wire is being raised up on said reel adjacent to either of the flanges of said reel, an output signal from said detecting means instructing said distributor to be reversed, characterized by that said wire raising up detecting means comprises at least two adjacent arms pivotally mounted on a fixed axis parallel to the axis of said reel and spring-loaded to be engaged against said wire wound on said reel; and an angular-electro converter to convert the angle at which said arms are pivotally moved relative to each other into an electric signal having the amplitude proportional to the angle.

3,997,129

MAGNETIC RECORDING/REPRODUCING APPARATUS

Itsuki Ban, 829, Higashioizumi, Nerima, Tokyo, and Kazunori Mochizuki, Nagano, both of Japan, assignors to Itsuki Ban, by said Kazunori Mochizuki, a part interest

Filed Feb. 9, 1976, Ser. No. 656,373
Claims priority, application Japan, Feb. 12, 1975, 50-16949; Apr. 16, 1975, 50-45338
Int. Cl.² G11B *15/30*, *15/29*, *15/22*
U.S. Cl. 242—201 **17 Claims**



1. A magnetic tape recording/reproducing apparatus having a plurality of push-buttons for directing changeover of tape-drive modes, said apparatus comprising:
a housing adapted to receive a magnetic tape disposed on a pair of reels;
capstan means rotatably mounted in said housing for transport of the tape at a predetermined linear speed;
an electrical motor mounted within said housing for driving said capstan means;
a pair of reel stands for mounting the tape reels;
means operably connected to said motor for alternatively driving one of said reel stands;
an idler mounted for movement into and out of contact with said capstan means;
means for biasing said idler toward said capstan means;
a reciprocating member mounted for movement between two positions responsive to said movement of said idler;
means for locking said idler in a position out of contact with said capstan means;
release means, responsive to depression of a first push-button, for release of said locking means, thereby allowing said biasing means to bring said idler into contact with said capstan means for one rotation by which rotation said idler is moved out of contact with said capstan means and temporarily held there by said locking means;
a plurality of slidable actuating bars, one for each tape drive mode, mounted for reciprocating movement between two positions;
means associated with each actuating bar for changing the tape drive mode responsive to said actuating bar movement;
means for biasing each actuating bar toward a first position;
actuating bar engaging means responsive to the depression of any one of said push-buttons for selectively engaging the one actuating bar associated with that push-button for movement with said reciprocating member to a second position; and
alternative-selection means, responsive to said reciprocating movement of said one actuating bar, for locking said actuating bar in said second position and releasing another actuating bar previously locked in said second position.

3,997,130

FISHING REELS

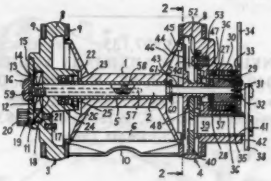
Hyman Policansky, P.O. Box 1154, Cape Town, South Africa

Filed Feb. 4, 1975, Ser. No. 547,026

Claims priority, application United Kingdom, Feb. 7, 1974, 5762/74

Int. Cl.² A01K 89/00

U.S. Cl. 242—211 6 Claims



1. A fishing reel of the multiplying type, comprising:

A. first and second end housings consisting essentially of first and second plastic mouldings, respectively,

B. a shaft supported between said end housings,

C. means defining a bearing aperture for the shaft in said first end housing moulding, said shaft projecting through said bearing aperture to the outside of said first moulding and being journalled in said bearing aperture,

D. a screw thread formed on the projecting end of said shaft,

E. a nut screwed onto said projecting end in abutting relation with the outside of said first moulding,

F. a spool for fishing line rotatably mounted on said shaft between said end housings,

G. a friction coupling comprising first and second parts, said first coupling part being rotatably mounted on said shaft in opposing relation to said second part which is connected to said spool, said spool and friction coupling parts being arranged on said shaft so that axial adjustment thereof effects relative axial adjustment of said coupling parts for varying the friction coupling pressure,

H. a winding handle rotatably mounted on one of said end housings,

I. gear means coupling said winding handle to said first coupling part,

J. means resisting turning movement of said nut and shaft,

K. manually operable means for turning said shaft and nut relative to each other, whereby to effect said relative axial adjustment of said coupling parts, said manually operable means comprising lever means secured to the end of said shaft on the outside of said second end housing, and

L. at least one spring disposed in a cavity formed in said second end housing moulding, said spring bearing against said lever means and thereby resiliently urging said shaft in an axial direction away from said first end housing.

3,997,131

ROTOR MEANS FOR AN AIRCRAFT

Alberto Kling, Am Hugel 14, 8136 Percha, Germany

Continuation of Ser. No. 531,075, Dec. 9, 1974, abandoned.

This application Apr. 5, 1976, Ser. No. 673,867

Claims priority, application Germany, Dec. 12, 1973, 2361852; Apr. 29, 1974, 2420709

Int. Cl.² B64C 29/00

U.S. Cl. 244—23 R 43 Claims

1. An aircraft comprising,

a fuselage,

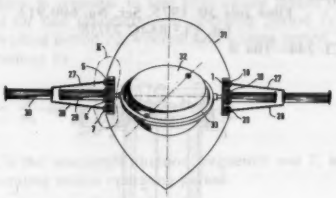
two coaxially counter-rotatable rotors,

blade mounts carried by said rotors,

each rotor being journaled to said fuselage about an imaginary axis of rotation common to both rotors,

each of said rotors carrying poles and cooperating with a counteracting pole carrying member to form at least one electromotor,

a current generator electrically connected to a pole carrying member of at least one rotor so that upon production of a frequency current a reciprocal field effect is created



between counteractive members to cause counter-rotation of said rotors,

the rotational speed of each rotor being regulated directly by varying the frequency of the current supplied.

3,997,132

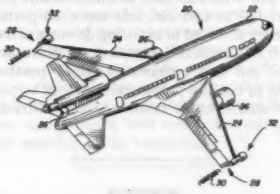
METHOD AND APPARATUS FOR CONTROLLING TIP VORTICES

John R. Erwin, Paradise Valley, Ariz., assignor to The Garrett Corporation, Los Angeles, Calif.

Filed Dec. 11, 1974, Ser. No. 531,655

Int. Cl.² B64C 23/06

U.S. Cl. 244—40 R 32 Claims



20. In combination with a lift wing of finite length forwardly movable in a fluid medium and having a tip end allowing drag-inducing vortex fluid flow from the higher pressure surface to the lower pressure surface of said wing about an axis extending along the length of said tip end:

a housing having a fluid duct and an exhaust opening disposed forwardly of said tip end such that exhaust flow therefrom is discharged in a rearward direction generally parallel to said axis to intercept said vortex; and

means associated with said exhaust opening for directing said exhaust flow to rotate about said axis coaxially to said vortex flow but in counter-rotating opposition to said vortex flow to materially reduce said drag.

22. A method of reducing drag induced by vortex fluid flow about a tip end of a lift wing of an aircraft having a jet engine disposed adjacent said tip end, comprising the steps of:

operating said engine to produce forward thrust for powering said aircraft; and

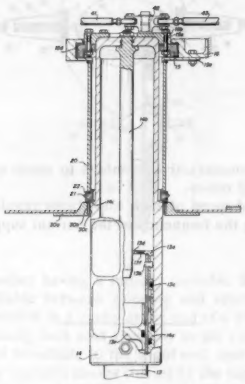
exhausting at least a portion of fluid flow from said engine completely forwardly of the span-wise directed neutral axis of said wing at said tip end in a rearward direction intercepting the outer surfaces of said wing at said tip end to thereby intercept and reduce said vortex flow to materially reduce said drag.

3,997,133

CRASH ATTENUATION LANDING GEAR

Castle H. Fagan, Irving, Tex., assignor to Textron, Inc., Fort Worth, Tex.

Filed July 30, 1975, Ser. No. 600,913
Int. Cl.[2] B64C *25/58*
U.S. Cl. 244—104 R 5 Claims



1. In a landing gear where an airframe is mounted on a cushioned strut including an airframe mounted portion guided along a landing gear portion after said landing gear touches down, crash attenuation means comprising:

a. a work absorbing tube secured at one end thereof to said airframe mounted portion in an encircling relation with respect to said airframe mounted portion, and

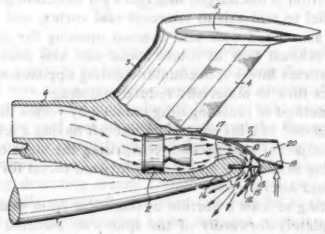
b. a work applying structural fitting secured to said airframe at the other end of the work absorbing tube adapted to engage and work said tube as said airframe moves downward relative to said airframe mounted portion to dissipate energy involved in arresting downward movement of said airframe including coupling structure between said airframe and said airframe mounted portion which is provided to fail at a predetermined load to permit movement of said airframe relative to said airframe mounted portion.

3,997,134

FUSELAGE TAIL JET ENGINE THRUST REVERSER

George T. Drakeley, Bellevue, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed Mar. 27, 1975, Ser. No. 562,587
Int. Cl.[2] B64D *33/04*
U.S. Cl. 244—110 B 4 Claims



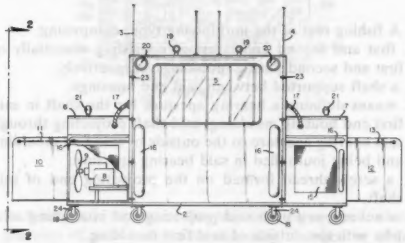
1. In an airplane fuselage power plant installation including a jet engine buried in the aft portion of the airplane fuselage and having a rearward-discharge duct opening in the tail of the fuselage, the improvement comprising reverse-thrust duct means branching from the rearward-discharge duct and consituting the sole reverse-thrust duct means, said reverse-thrust duct means opening through the bottom of the fuselage and being directed only downwardly and forwardly for discharge of jet exhaust producing thrust having a rearward component and an upward component, and control means for selectively proportioning jet exhaust discharge between the rearward-discharge duct and said sole reverse-thrust duct means.

3,997,135

MANEUVERABLE AUXILIARY VEHICLE

Peterson, 5040 Sheriff Road, NE., Washington, D.C. 20003

Continuation of Ser. No. 405,217, Oct. 10, 1973, abandoned.
This application June 4, 1975, Ser. No. 583,722
Int. Cl.[2] B64D *1/08*
U.S. Cl. 244—137 R 3 Claims



1. Emergency rescue apparatus for the rescue of persons from buildings and other areas comprising:

a substantially enclosed cabin means for housing persons and having at least one closable entranceway for the ingress and egress of persons and being incapable of self-propulsion along its longitudinal axis.

a plurality of cables attached to said cabin means for supporting and transporting said cabin means by a helicopter or the like to a position adjacent an external sidewall of a building where a rescue operation is to be effected.

force applying means at each end of said cabin means for exerting a variable horizontal force component on the relevant end of said cabin means with a direction transverse to the longitudinal axis of said cabin means,

and control means acting on each said force exerting means to control the magnitude of said transverse force component acting on said cabin means,

said force applying means and said control means being effective to selectively rotate said cabin means about a vertical axis or to move said cabin means translationly in a direction transverse to its said longitudinal axis,

whereby said cabin means when positioned by the helicopter or the like adjacent the external wall of the building may be selectively rotated in position about a vertical axis or moved in translation laterally relative to its longitudinal axis so as to move said cabin means closely adjacent and parallel to said external wall to facilitate the movement of persons between said cabin means and the building.

3,997,136

TOY-KITE AIRPLANE

Alfred C. Finn, deceased, late of Tustin, Calif., by Lucretta M. Finn, surviving spouse, 17621 Irvine Blvd., Suite 101, Tustin, Calif. 92680

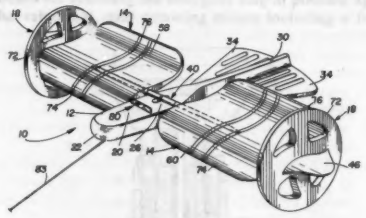
Filed Jan. 2, 1975, Ser. No. 537,914
Int. Cl.[2] B64C *31/06*
U.S. Cl. 244—153 A 8 Claims

1. In combination with an airplane-like-kite toy having a fuselage wherein wing means are rotatable about a transverse

axis thereon, the improvement comprising a support means demountably attached to said fuselage and whereby said rotatable wing means is supported thereon, and wherein said support means comprises:

bearing means adapted to receive said wing means for rotational movement therein, said bearing means being disposed transversely to the length of said fuselage;

means for detachably securing said support means to said fuselage.



wherein said bearing means and said detachable securing means are formed as an integral unit, and wherein the bearing means comprises a pair of bearing sleeves oppositely disposed and axially aligned with each other and having a slotted opening centrally interposed therebetween; and

means for restraining said wing means from longitudinal movement relative to said bearing means.

3,997,137
MINIMIZATION OF RESIDUAL SPACECRAFT NUTATION DUE TO DISTURBING TORQUES

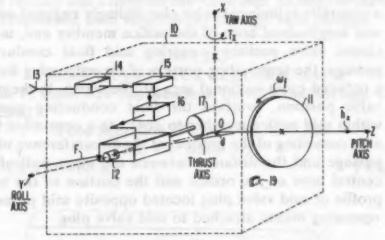
Kevin John Phillips, Hightstown, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Dec. 10, 1973, Ser. No. 423,441

Disclosure was also published under second Trial Voluntary Protest Program on Feb. 17, 1976

Int. Cl.² B64G *1/20*

U.S. Cl. 244—169 **7 Claims**



1. A method for minimizing nutation in a spacecraft of the dual spin type having a spin axis and a characteristic nutation period and further having a platform despun from a spinning member, comprising the steps of:

transmitting signals to spacecraft receiver means causing a receiver means output signal;

coupling said receiver output signal to logic circuit means causing a logic circuit means output signal;

activating a force generating means mounted on said platform a first time for a predetermined operating period T_1 in response to said logic circuit output signal, said predetermined operating period determined by said logic means to be a predetermined portion of said nutation period of said spacecraft;

deactivating said force generating means for a waiting period T_w, in response to said logic circuit means output signal at the end of said predetermined operating period T_1;

activating said force generating means automatically a second time in response to said logic circuit means output signal for said predetermined operating period T_1 after said waiting period T_w, wherein said waiting period, T_w, is determined by:

$$T_w = \frac{2}{\omega_n} \tan^{-1} \left[\frac{1 + \cos \omega_n T_1}{\sin \omega_n T_1} \right]$$

where ω_n is the spacecraft nutation frequency and T_1 is said force generating means operating period.

3,997,138
SECURING DEVICES AND STRUCTURES

Henry Vernon Crock, and Ljubomir Pericic, both of 2 Collins St., Melbourne, Victoria, Australia (3000)

Filed June 16, 1975, Ser. No. 587,412

Int. Cl.² A61F *5/01*

U.S. Cl. 248—67.5 **3 Claims**

1. A securing device comprising a component having at one end a tapered screw for insertion into an element and at its other end a releasable clamping assembly for allowing an elongated member to be releasably secured to the component, said assembly including a boss having a first upper surface on the component and a movable hollow member having a second surface facing said first upper surface, said surfaces having aligned grooves for receiving the elongated member, said movable member having side walls depending from said second surface and surrounding said boss and having apertures aligned with said grooves for permitting entry of the elongated member into said grooves, and means in said assembly for securing said member to the component.

3,997,139
KNOCKDOWN AQUARIUM STAND

Richard S. Young, Frankenmuth, and Leo E. Hearn, Flint, both of Mich., assignors to Pentaco Enterprises Corporation, Clio, Mich.

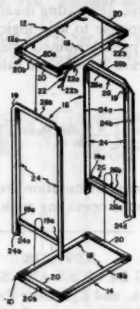
Filed Nov. 23, 1973, Ser. No. 418,408

Int. Cl.² F16M *11/32*

U.S. Cl. 248—165 **7 Claims**

1. A knockdown support stand comprising elongate resiliently bendable leg means having upwardly projecting first flange portions at their upper ends, an upper peripheral frame member having a peripheral downwardly extending first flange adapted to engage said first flange portions of said leg means, brace members on said upper frame member inclined downwardly from said upper frame member to project below said first flange on said upper member and engageable with said leg means at a location spaced downwardly from said first flange portions when said first flange portions are engaged with said first flange to normally locate said leg means in an outwardly and downwardly divergent relationship relative to each other, upwardly projecting second flange portions on said leg means at a location intermediate the ends of said leg means, and a lower peripheral frame member having a peripheral downwardly extending second flange adapted to engage the outer sides of said second flange portions to hold said leg

means in a generally vertical relationship wherein said leg means are resiliently bent inwardly from the divergent relationship established by said first flange and said brace members.

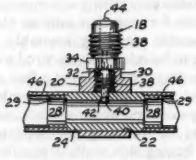


3,997,140

REFRIGERANT LINE CONNECTING TEE WITH STEP DIAMETER BUSHING

John W. Mullins, P.O. Box 20524, Oklahoma City, Okla. 73120

Filed Dec. 30, 1974, Ser. No. 537,494
Int. Cl.² F16K *51/00*
U.S. Cl. 251—145 **1 Claim**



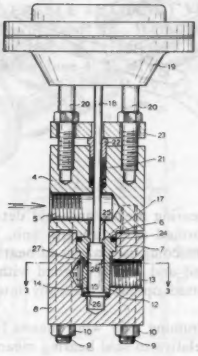
1. A refrigerant line tee, comprising:
an elongated body having a transverse bore and having an axial threaded bore in one end portion intersecting the transverse bore;
a sleeve closely received coaxially by and projecting beyond the respective ends of the transverse bore,
the respective end portions of said sleeve being diametrically reduced and counterbored to form outwardly facing outer and inner annular shoulders, respectively, for selectively entering the inside surface of the end portion of one diameter size line or surrounding the outside diameter of the end portion of a diametrically smaller line,
said sleeve having an aperture in its wall communicating with the threaded bore;
an elongated bushing of uniform external diameter slidably received telescopically at either of its end portions by each counterbored end portion of said tubular member,
said bushing having a central bore and being counterbored from one end portion forming an annular internal shoulder intermediate its ends defining the juncture of two additional different inside diameter surfaces for selective reception of and connection with the outside diameter of an end portion of corresponding size refrigerant lines; and,
a valve housing threadedly engaged within the threaded bore and having a coaxial tip entering and sealing with the wall forming the aperture in said sleeve,
said valve housing having a central bore and having a depressible valve for opening and closing the central bore.

3,997,141

FLOW CONTROL VALVE

Hans D. Baumann, P.O. Box 92, Manville, R.I. 02838

Filed Nov. 28, 1975, Ser. No. 636,166
Int. Cl.² F16K *3/32*
U.S. Cl. 251—205 **5 Claims**



1. Flow Control Valve, comprising
a. a housing having fluid communicating inlet and outlet ports, and a central vertical passage interconnecting said inlet and outlet ports;
b. an orifice member suitably retained within said central vertical passage of said housing and having a central longitudinal bore, only one fluid conducting passage located within said orifice member and extending from the inner bore throughout the radial width of said orifice member;
c. sealing means located at opposite longitudinal terminating surfaces of said orifice member;
d. a generally cylindrical valve plug slidingly engaged within said longitudinal bore of the orifice member and, in the closed valve position, covering said fluid conducting passage, the terminating portion of the valve plug having a reduced cross-sectional area profile which, in the open valve position, overlaps the fluid conducting passage within said orifice member to generate a controlled flow area consisting of the product of the circumference of the passage and the distance between the inner wall of the central bore of the orifice and the portion of the outer profile of said valve plug located opposite said passage;
e. operating means attached to said valve plug.

3,997,142

PRESSURE SENSITIVE AND TEMPERATURE RESPONSIVE ROTARY VALVE

William W. Broadway, Houston, Tex., assignor to FMC Corporation, San Jose, Calif.

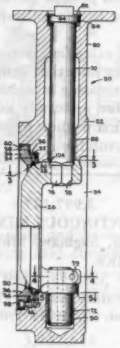
Filed Apr. 21, 1975, Ser. No. 570,122
Int. Cl.² F16K *1/22*
U.S. Cl. 251—307 **7 Claims**

1. A rotary valve comprising, in combination,
a. a generally annular valve body defining a fluid flow passage,
b. a fluid flow control element rotatably supported in the flow passage for controlling the flow of fluids through the valve,
c. an annular yieldable, pressure-responsive valve seat posi-

tioned in the flow passage for cooperation with the flow control element to establish a fluid flow barrier through said passage,

d. a temperature-responsive valve seat energizer ring positioned in the flow passage for imposing a force on the valve seat to cause said seat to establish a fluid-tight seal with the flow control element and the valve body, said energizer ring having an annular frusto-conical surface, and

e. means for retaining the energizer ring in position against the valve seat, said retaining means including a frusto-



conical surface complementary to and in contact with the energizer ring frusto-conical surface,

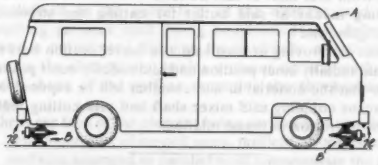
said energizer ring having a coefficient of contraction greater than the coefficient of contraction of said valve body and energizer ring retaining means, whereby when the valve is subjected to a reduction in temperature the energizer ring contracts more than the valve body and retaining means and the aforesaid frusto-conical surfaces cooperate to cause radial and axial movement of the energizer ring with respect to the valve body and retaining means to exert a seal-effecting force both radially and axially on the valve seat, thereby to maintain the established fluid flow barrier through said passage.

3,997,143

VEHICLE IN-PLACE ELECTRIC JACK

Frank P. Rose, 328 San Domingo Drive, Palm Springs, Calif. 92262

Filed Sept. 2, 1975, Ser. No. 609,368
Int. Cl.² B66F *3/22*
U.S. Cl. 254—86 R **7 Claims**



1. Vehicle in-place jacking means for mounting on the frame structure of the vehicle, comprising:

a. a jacking mechanism having pivotally connected sets of levers constituting a lazy-tong configuration extending between an upper attaching member and a lower ground engaging member, one set of said levers having adjacent ends pivoted on a first pivot block structure, and another set of said levers having adjacent ends pivoted on a second pivot block structure;

b. an actuating screw member operable to selectively extend and retract the levers to and from a jacking position, said screw member having one end rotatable in said first block structure, but retained against axial movement therein, and being provided with screw threads for threaded engagement with said second block structure, said screw threads being terminated short of the other end of said screw member, whereby threaded movement of the second block structure will be terminated upon movement of the levers to a predetermined retracted position;

c. a laterally extending back frame plate rigidly secured to and supported from said first pivot block;

d. a bearing on said plate for rotatably supporting said one end of the screw member;

e. a driving motor wholly supported on said back plate so as to extend therefrom on the same side as the levers of said jacking mechanisms, said motor having a driving shaft extending through said back plate in parallel relation to said screw member; and

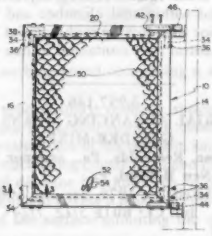
f. a driving connection between said motor shaft and said screw member positioned on the opposite side of said back plate from the jacking levers and motor.

3,997,144

GATE

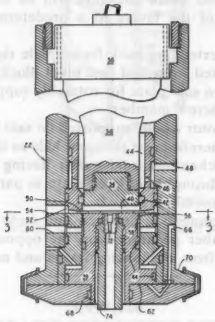
Rudolph E. Parisien, 891 Rainbow St., Ottawa, Canada

Filed Feb. 19, 1975, Ser. No. 551,046
Claims priority, application Canada, Feb. 21, 1974, 193179
Int. Cl.² E04H *17/14*
U.S. Cl. 256—32 **2 Claims**



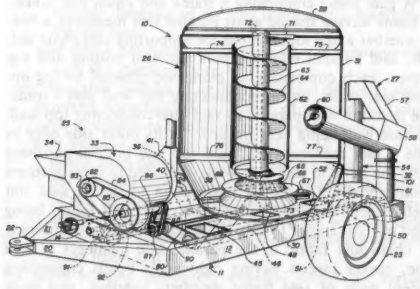
1. A gate panel comprising a frame and chain link fabric, said frame having spaced apart parallel side members, a bottom member and a top member for supporting said chain link fabric, said parallel side members and said bottom and top members each comprising an elongated channel having opposing side walls, an interconnecting top wall and a transverse partition wall parallel to said interconnecting top wall, each side wall being bent inwardly at its outer side edge to define a slot therebetween, said top and bottom members having the bend in said side walls extended to form portions of substantially J-shaped cross-section to define said slot therebetween; an end link of said chain link fabric being turned at right angles to said chain link fabric for positioning said chain link fabric in the parallel side members of said frame, corner inserts having right angle bends connecting adjacent ends of said frame members together, and hook means for securely attaching said chain link fabric at the top and bottom thereof through the said slots in said top and bottom members and onto said J-shaped cross-section.

3,997,145
OSCILLATING MIXER AND METHOD
Glendon M. Benson, Danville, Calif., assignor to New Process Industries, Inc., Minneapolis, Minn.
Continuation of Ser. No. 259,885, June 5, 1972, abandoned. This application Dec. 16, 1974, Ser. No. 533,378
Int. Cl.² B01F *11/02*
U.S. Cl. 259—2 **16 Claims**



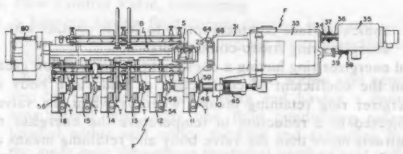
1. A material processing device comprising a disc-shaped chamber having opposed circular faces in which the spacing between said circular faces is approximately equal to or less than the ratio of the chamber surface area to the propagational wavelength in the flowable material contained in said chamber, means for introducing flowable material in a coarsely dispersed state into said chamber at the periphery of the chamber, said introducing means comprising narrow flow channels that produce coarse dispersions by fluid circulation at all entrances to said chamber, and means for producing substantially continuous oscillatory squeezing action on the flowable material within said chamber, said oscillatory squeezing means including a surface of said chamber and means for vibrating said surface to produce localized vibrational interactions and high shear rates between adjacent layers of said flowable material within said chamber and thereby process said material prior to removing said material from said chamber through a central port contained in one disc-shaped end plate.

3,997,146
MATERIAL ADVANCING MEANS FOR A GRINDER-MIXER
Charles M. Kline, Reinholds, Pa., assignor to Sperry Rand Corporation, New Holland, Pa.
Filed Feb. 23, 1976, Ser. No. 660,602
Int. Cl.² B01F *5/12, 7/24*
U.S. Cl. 259—8 **13 Claims**



1. In a mixing apparatus of the type including a frame,
a tank supported by the frame, having a top, a bottom and outer wall means for confining feed material,
means for transferring material into the tank,
means for unloading material from said tank, and
a vertical assembly mounted within the tank for mixing material fed into the tank, said assembly comprising a vertical auger housing and rotatably mounted material advancing means having a first portion comprising a vertical auger positioned partly within the housing adapted to receive material and advance it upwardly through said housing and an improved second material advancing portion below and axially aligned with said first portion, for advancing material upwardly to said first portion, said second portion including
a. a core member having an outer surface converging upwardly, and
b. spiral flighting extending outwardly from said outer surface to engage materials being mixed,
c. said flighting increasing in width from its lower end to its upper end for uniformly advancing material upwardly to said first portion by maintaining the volume displaced per revolution.

3,997,147
CONTINUOUS MIXER
Clarence K. Scherping, Saginaw, Mich., assignor to Baker Perkins, Saginaw, Mich.
Division of Ser. No. 355,755, April 30, 1973, Pat. No. 3,913,893. This application Mar. 3, 1975, Ser. No. 554,569
Int. Cl.² B01F *7/08*
U.S. Cl. 259—191 **11 Claims**

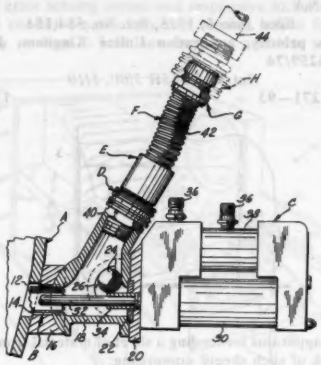


2. A continuous mixer for explosive material and the like comprising:
frame support means;
a mixing barrel thereon including a plurality of longitudinally split barrel sections forming an axially extending passage having an inlet and an outlet, at least one of said barrel sections being movable between a closed, radially inner barrel forming position and a radially outer, open position;
an axially disposed mixing shaft mounted in said passage;
die means at said outlet for extruding material in strands;
means mounting said barrel and said shaft for relative movement to mix material supplied to said inlet while moving it from said inlet to said outlet;
cutting means at said outlet for cutting the strands to lengths; and
means for moving at least said one barrel section between said radially inner position and said radially outer position so that the material in said chamber will be exposed; and means coupling said mixer shaft and said cutting means for operation in timed relation.

3,997,148
COUPLER FOR TUYERE PUNCHES
Thomas D. Karcher, Rocky River, and Richard J. Silagy, Parma, both of Ohio, assignors to The Hansen Manufacturing Co., Cleveland, Ohio
Filed Sept. 23, 1974, Ser. No. 508,534
Int. Cl.² C21C *5/42;* **C22B** *15/06*
U.S. Cl. 266—218 **13 Claims**

1. Apparatus comprising; a converter for processing metals

and including a tuyere through which blowing gas is supplied, a blowing gas supply conduit having one conduit end portion connected in fluid flow communication with said tuyere by a quick disconnect coupling, a plug member cooperable with



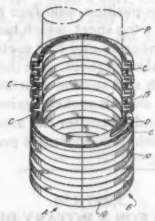
said quick release coupling and having an elongated sleeve portion slidably receiving said conduit end portion in fluid sealing engagement therewith for providing relative telescoping movement between said plug and conduit end portion.

3,997,149

SHOCK ABSORBING GUARD

Richard P. Stout, Whittier, Calif., assignor to Technibilt Corporation, Burbank, Calif.

Filed June 6, 1975, Ser. No. 584,273
Int. Cl.² F16F 7/12
U.S. Cl. 267—140 18 Claims



1. A shock absorbing guard comprising a shock absorbing element having a plurality of spaced apart, resilient shock absorbing surfaces arranged in parallel rows and constructed and defined on the outer face of the element, said shock absorbing surfaces each being constructed and defined to extend a preselected distance longitudinally of the parallel rows on the element and having a planar surface conforming to the shape of the surface mounting the shock absorbing guard,

the inner face of the element being constructed and defined with a plurality of spaced apart, resilient, shock absorbing surfaces arranged in parallel rows intermediate the parallel rows of shock absorbing surfaces of the outer face of the element and spaced a preselected distance inwardly of the surfaces on the outer face of the element, the inner shock absorbing elements each being constructed and defined to extend a preselected distance longitudinally of the parallel rows on the element and having a planar surface conforming to the shape of the surface mounting the shock absorbing guard,

a plurality of resilient, solid ribs, individually connected with one end of a shock absorbing surface on the outer face of the element with the adjacent end of a shock absorbing surface on the inner face of the element to thereby interconnect each of said plurality of shock absorbing surfaces into a unitary shock absorbing element,

a plurality of resilient, solid shock absorbing fingers integral with, and individual to and continuous with the inner surface of at least some of the shock absorbing surfaces of the outer face of the element and arranged substantially perpendicular to said inner surface and extending a preselected distance outwardly therefrom and terminating short of the inner surface of the inner shock absorbing surface of the inner face of the element, the length and number of said shock absorbing fingers being selected to provide a preselected resiliency to the shock absorbing element related to the distance that fingers move into engagement with the surface mounting the shock absorbing guard,

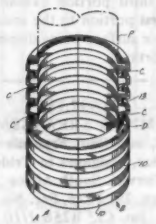
the shock absorbing surfaces on the inner face of the element being engageable with the surface mounting the shock absorbing guard.

3,997,150

SHOCK ABSORBING GUARD

Louis J. Hanson, Orange, and Lawrence E. Houston, Burbank, both of Calif., assignors to Technibilt Corporation, Burbank, Calif.

Filed June 6, 1975, Ser. No. 584,276
Int. Cl.² F16F 7/12
U.S. Cl. 267—140 19 Claims



1. A shock absorbing guard comprising a shock absorbing element having

a plurality of spaced apart, resilient, shock absorbing surfaces arranged in parallel rows and constructed and defined on the outer face of the element, said shock absorbing surfaces each being constructed and defined to extend a preselected distance longitudinally of the parallel rows on the element and having a planar surface conforming to the shape of the surface mounting the shock absorbing guard,

the inner face of the element constructed and defined with a plurality of spaced apart, resilient shock absorbing surfaces arranged in parallel rows intermediate the parallel rows of shock absorbing surfaces of the outer face of the element and spaced a preselected distance inwardly of the surfaces on the outer face of the element, the inner shock absorbing elements each being constructed and defined to extend a preselected distance longitudinally of the parallel rows on the element and having a planar surface conforming to the shape of the surface mounting the shock absorbing guard, and

a plurality of resilient solid ribs individually connected with one end of a shock absorbing surface on the outer face of the element with the adjacent end of a shock absorbing surface on the inner face of the element to thereby interconnect each of said plurality of shock absorbing surfaces into a unitary shock absorbing element coacting to absorb impact energy received at the shock absorbing surface on the outer face of the element,

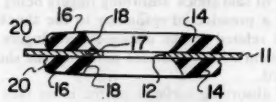
the shock absorbing surfaces on the inner face of the element being engageable with the surface mounting the shock absorbing guard.

3,997,151

MODULAR CUSHIONING PAD

Charles J. Leingang, Erie, Pa., assignor to Lord Corporation, Erie, Pa.

Filed May 21, 1975, Ser. No. 579,334
Int. Cl.² F16F 3/10
U.S. Cl. 267—152 8 Claims



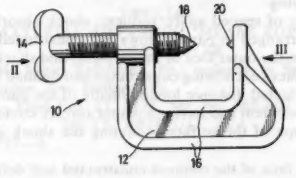
1. A modular cushioning pad comprising a rigid plate and at least one elastomeric cushion centered on said plate, the cushion having a first end surface bonded to a side of the plate, a second end surface opposite and spaced from the first end surface, and an outside surface defining the outer side periphery of the cushion, the outside surface of the cushion having (a) a first portion sloping inwardly of the cushion and away from the first end surface and extending part way to the second end surface, (b) a second portion spaced inwardly of the first portion and sloping radially inwardly of the cushion and away from said first end portion toward said second end surface and (c) a third portion extending inwardly of the cushion from the first portion to the second portion, the first portion of the outside surface being disposed outwardly of the second and third portions.

3,997,152

CLAMPING ARRANGEMENT

Horst Werner Sass, and Paul Francois Roos, both of Cape Town, South Africa, assignors to Trident Plastics (Proprietary) Limited, Tiervlei, South Africa

Filed Sept. 29, 1975, Ser. No. 617,657
Int. Cl.² B25B 1/10
U.S. Cl. 269—249 2 Claims



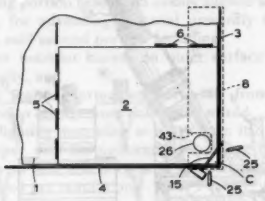
1. A clamp for holding a work piece in position in an anodizing bath, which clamp is made completely of a synthetic plastic material, which is resistant to liquid contained in the anodizing bath, the clamp comprising a U-shaped frame having two substantially parallel legs; a first contact tip made of titanium fixed by being partially embedded in the material of the clamp adjacent the end of one leg of the U-shaped frame, the first contact tip facing towards the other leg; a screw-threaded hole adjacent the end of the other leg of the U-shaped frame and being in alignment with the first contact tip; a manually operable screw screwed into the threaded hole; and a second contact tip made of titanium and provided at the end of the screw facing the first contact tip and being fixed by being partially embedded in the end of the screw, the two contact tips being in alignment so as to clamp a work piece between them on turning of the screw to move the second contact tip towards the first contact tip.

3,997,153

SHEET FEEDING APPARATUS

Ronald Howard Britt, Hassocks, England; Jan de Bruin, Bilthoven, Netherlands, and David Gordon Boulter, Wivelsfield Green, England, assignors to U.S. Philips Corporation, New York, N.Y.

Filed June 5, 1975, Ser. No. 584,154
Claims priority, application United Kingdom, June 13, 1974, 26259/74
Int. Cl.² B65H 3/08, 5/10
U.S. Cl. 271—93 13 Claims



1. An apparatus for feeding a sheet of material from the top of a stack of such sheets, comprising:

first suction means for pulling a corner portion of a top sheet of a stack upwards, said suction means disposed to suck against a portion of the top sheet at a location a given distance from the corner of the sheet;

a member arranged to extend over a corner portion of the stack between said location and said corner;

means for moving said first suction means so as to pull a corner portion of the top sheet from beneath said member; and

a second suction means for transferring the top sheet away from the stack;

wherein said second suction means comprises a transfer bar having a lower face having suction apertures in said face, said bar being so arranged that a portion of said face extends over said corner portion of the stack when said bar is in a pick-up position, said face being closer to the corner portion of a top sheet, which has been pulled from beneath said member by said first suction means, than to any other part of the top sheet, such that upon application of suction through said suction apertures first the corner portion of the top sheet is sucked against the lower face of the transfer bar and thereafter the area of attachment of the top sheet to said face increases progressively.

3,997,154

STACKING SYSTEM FOR A ROTARY DRUM COLLATOR

Hans C. Mol, Wilton, Conn., assignor to Pitney-Bowes, Inc., Stamford, Conn.

Filed Oct. 20, 1975, Ser. No. 623,626
Int. Cl.² B65H 31/08, 33/08
U.S. Cl. 271—215 8 Claims

1. A collator in combination with a stacking system having three off-set stack positions comprising:

a collating mechanism for feeding sheets of material to a stacking deck in a collated sequence;

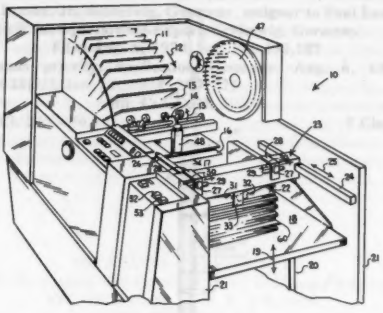
a stacking deck for receiving sheets of material being fed thereto and for supporting said sheets in off-set stacks;

means defining a feed path along which the sheets are fed from said collating mechanism to said stacking deck;

error sensing means disposed along said feed path for sensing an improper feed condition of said sheet material being fed from said collating mechanism to said stacking deck; and

a three position stop means disposed adjacent said stacking deck for stopping incoming sheets being received by said stacking deck and positioning said incoming sheets in off-set stacks, said stop means having first and second stop members alternately movable between a sheet stop-

ping and a sheet non-stopping position, said second stop member being mounted with respect to the first stop member so as to be capable of stopping sheets when said first stop member is in the non-stopping position, said first and second stop members being operatively connected to said error sensing means and responsive to an improper feed condition sensed by said sensing means for selectively moving to said non-stopping position, such that



both said first and second stop members are in their respective non-stopping positions when said sensing means senses an improper feed condition, and a third stop member for stopping sheet material when said first and second stop members are both in their respective non-stopping positions, whereby third offset sheet is provided for improperly fed sheet material without having to stop the collating mechanism.

3,997,155

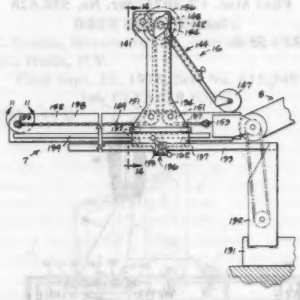
SHEET HANDLING APPARATUS

Merrill D. Martin, No. 2 Mall Court, Oakland, Calif. 94611

Division of Ser. No. 593,367, July 7, 1975. This application Apr. 13, 1976, Ser. No. 676,523

Int. Cl.² B65H 29/22

U.S. Cl. 271—272 **4 Claims**



1. An adjustable snubber device for a conveyor having movable frame members, and stationary supports,

a fixed element on said supports along each side of said movable conveyor frame,

a perpendicular bracke clamped on each support extending upwardly to above the level of said conveyor,

a cross-member connecting the brackets spaced above said conveyor,

a plurality of snubber arms extended downwardly from said cross member,

snubber rollers on the lower free ends of said arms,

sprocket means on each bracket spaced above said fixed element,

idler sprockets on each bracket adjacent said movable conveyor frame,

and a chain on said sprocket means extended around said idler sprockets in opposite directions, and having its ends anchored on the adjacent movable frame member whereby said chain idles around said sprocket means and said idler sprockets during movement of said conveyor,

releasable clamping means to clamp each bracket on the adjacent fixed element and means to rotate the sprocket means of said brackets simultaneously, when said clamping means are released, thereby to shift the position of said brackets on said support relatively to said frame members, and to locate said snubber rollers in adjusted position relatively to sheets conveyed on said conveyor.

3,997,156

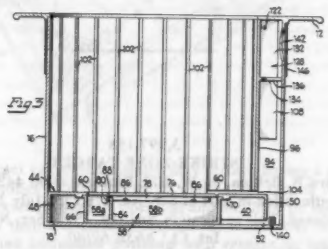
MAGIC HAT

Gordon A. Barlow, Skokie, and John R. Wildman, Hanover Park, both of Ill., assignors to Marvin Glass & Associates, Chicago, Ill.

Filed Jan. 22, 1975, Ser. No. 542,954

Int. Cl.² A63J 21/00

U.S. Cl. 272—8 R **11 Claims**



1. A hat, comprising:

a generally cylindrical housing defining the main body of the hat and having an end wall closing one end of the cylindrical housing;

means defining a hidden cavity extending longitudinally along a portion of the inside of said housing, said means including a longitudinally extending arcuate shell of a larger diameter than that of the cylindrical housing and spaced therefrom on the inside thereof so as to span a side portion thereof and another end wall between the shell and the adjacent cylindrical portion of the housing defining the hidden cavity therebehind; and

means defining an inwardly movable wall portion of said shell defining a door to gain access to the cavity defined between the shell and the adjacent portion of the cylindrical housing.

3,997,157

COMPETITIVE SKILL-TYPE GAME

Burton C. Meyer, Downers Grove, Ill., assignor to Marvin Glass & Associates, Chicago, Ill.

Filed Feb. 18, 1976, Ser. No. 659,147

Int. Cl.² A63F 9/00

U.S. Cl. 273—1 R **9 Claims**

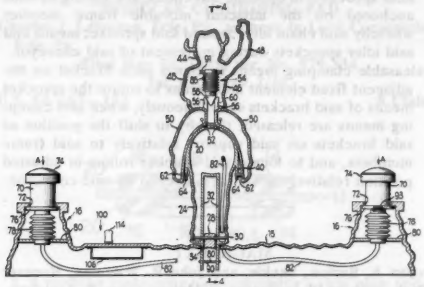
1. A competitive skill type game, comprising:

a base support;

a first figure toy mounted on said base support for movement relative thereto;

a first actuating means operatively associated with said first figure toy and selectively operable by one player of the game for causing irregular movement of said first figure toy relative to said base support;

a second figure toy positionable on said first figure toy and including latch means therebetween but normally biased out of engagement to permit the second figure toy to be thrown from said first figure toy in response to said selective irregular movement thereof; and



a second actuating means operatively associated with said second figure toy and operably by a second player for intermittently engaging said latch means to prevent the second figure to be thrown from said first figure toy.

3,997,158

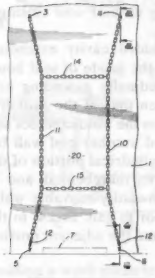
STRIKE-ZONE TARGET

Howard B. Britton, 96 W. Hill, Rittman, Ohio 44270

Continuation-in-part of Ser. No. 275,215, July 26, 1972, abandoned. This application Nov. 19, 1973, Ser. No. 416,901

Int. Cl.[2] A63B *69/40*

U.S. Cl. 273—26 A 15 Claims



1. A strike-zone target for baseball practice which comprises a vertical backstop which is a wall designed primarily for another use, two vertical, elongate, flexible slightly extensible members said vertical members each being fastened at its top and bottom to the backstop by projecting means all of which are substantially the same length, at locations spaced somewhat more than seventeen inches from one another; and two vertically spaced, horizontal, elongate flexible means shiftably engaged with said vertical members to define targets of varied sizes and located at varied distances from the ground and drawing the vertical members toward one another, whereby the vertical and horizontal members define a rectangular strike-zone target somewhat over seventeen inches wide, said strike-zone target being spaced 2 to 5 inches in front of the backstop.

3,997,159

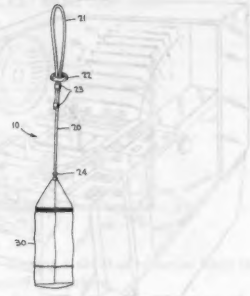
TENNIS TRAINING DEVICE

Farouk S. Malhas, 3520 W. Place, NW., Washington, D.C. 20007

Division of Ser. No. 20,332, March 17, 1970, Pat. No. 3,653,660. This application Feb. 1, 1972, Ser. No. 222,549

Int. Cl.[2] A63B *69/38*

U.S. Cl. 273—29 A 3 Claims



1. A tennis serve training device comprising a weight member having a flexible tether secured thereto and terminating in grip means for being gripped in the hand; said tether extending from said grip means to said weight member and the overall length of said weight member and tether being predetermined as an overall length of a tennis racket; said tether being flexible in any direction and longer than said weight member so as to bend substantially in response to a continuous swinging motion of the device in a simulated tennis serve to indicate improper serve motion by the user; said weight member being tubular, said tether being secured thereto in axial alignment therewith, and said weight member being configured to hold one or more tennis balls in axial alignment with said tether.

3,997,160

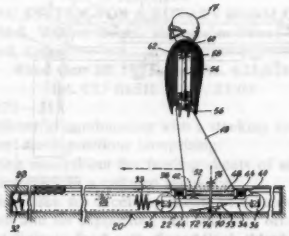
FOOTBALL TRAINING AID

Edward G. George, 17 Maughan Road, Baie d'Urfé, Quebec, Canada

Filed Mar. 17, 1975, Ser. No. 558,628

Int. Cl.[2] A63B *67/00*

U.S. Cl. 273—55 R 10 Claims



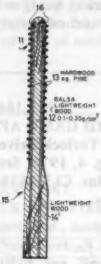
1. A football training aid comprising an elongated, hollow horizontal housing comprising a track adapted to be located on a supporting surface, a carriage adapted to move a predetermined distance in said housing, an upstanding member mounted on said carriage; an impact-receiving means mounted on the upstanding member, said carriage being biased against movement in one direction along the track to thereby apply reactive pressure against the rush of the user in said direction, the carriage including an elongated bearing shaft extending in the direction of travel of said carriage, the

upstanding member including a sleeve journaled on said bearing shaft for lateral pivotal movement about the longitudinal axis of the bearing shaft; and torsion spring means biasingly connected to said sleeve for biasing the lateral pivoting movement of said upstanding member.

3,997,161
TABLE-TENNIS BAT

Paul Lemke, Jr., Schleswig, Germany, assignor to Paul Lemke Fabrik fur Sportartikel-Export, Schleswig, Germany

Filed Aug. 6, 1974, Ser. No. 495,187
Claims priority, application Germany, Aug. 6, 1973, 7329025[U]; Jan. 21, 1974, 2402725
Int. Cl.² A63B *59/04*
U.S. Cl. 273—76 **7 Claims**

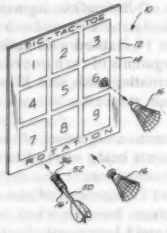


1. A table-tennis bat defined by a relatively narrow handle portion and a relatively wide flat table-tennis ball striking blade portion, comprising: a core sheet of lightweight wood having a mass density of 0.1 to 0.35 g/cm³ and extending throughout the area of the handle portion and the blade portion of said bat; on each side of said core sheet, a lamina sheet of wood considerably harder than the wood of said core sheet and generally coextensive with said core sheet; and an elastomeric outermost sheet joined to the outer surface of each lamina sheet providing a playing surface throughout said blade portion.

3,997,162
DART BOARD GAME

Francis E. Scullin, Havertown, Pa., assignor to Crown Recreation, Inc., Hollis, N.Y.

Filed Sept. 22, 1975, Ser. No. 615,349
Int. Cl.² A63B *65/02*
U.S. Cl. 273—95 R **13 Claims**

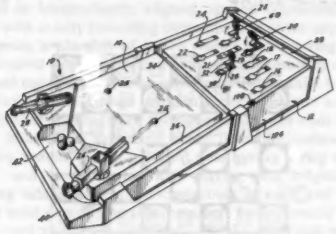


1. A dart board game comprising, in combination, a target board having a target face and a dart including a flexible and resilient tip and a marker removably engaged with said tip, said marker and target board including cooperating means for retaining the marker on the target face upon impact of the dart tip with the target face, said flexible and resilient tip being compressed upon such an impact to propel the dart away from the target face; said resilient tip and marker including cooperating means for normally holding the marker in the tip and for releasing the marker in response to propulsion of the dart away from the target face after an impact whereby the marker is disengaged from said tip and remains on the target face while the dart moves away from the target face; said cooperating means on said marker and resilient tip comprising a centrally located outwardly directed stem on said resilient tip and receptacle means on said marker for frictionally and releasably engaging said stem.

3,997,163
TARGET GAME

Julius Cooper, New Hyde Park; Edward Snyder, III, Dix Hills, and Burt Ensmann, Flushing, all of N.Y., assignors to Ideal Toy Corporation, Hollis, N.Y.

Filed Feb. 3, 1975, Ser. No. 546,226
Int. Cl.² A63F *7/00*
U.S. Cl. 273—121 A **18 Claims**

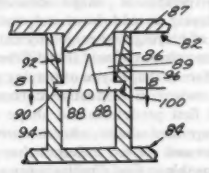


1. A target game comprising a play surface having a plurality of openings formed therein; a plurality of targets respectively associated with said openings and mounted on said play surface in their associated openings for movement between exposed and concealed positions with respect to said play surface, means for moving said targets between said exposed and concealed positions in an apparently random sequence; a plurality of projectiles; and means for directing said projectiles at said targets; said targets including means for capturing and retaining a projectile engaging the target, and said projectiles having a maximum dimension which is larger than the maximum width dimension of said openings thereby to cooperate with said openings in said play surface and prevent movement of the targets from their exposed to their concealed positions when engaged in the capturing and retaining means of the target.

3,997,164
ROAD HOCKEY PUCK

Thomas Paul White, Sr., 109 Gilbert St., Saint John, New Brunswick, Canada

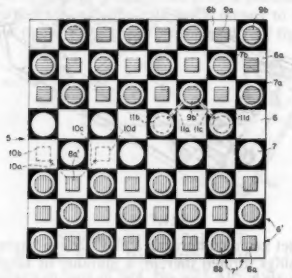
Continuation of Ser. No. 51,310, June 30, 1970, abandoned. This application Jan. 2, 1973, Ser. No. 320,176
Int. Cl.² A63B *71/00*
U.S. Cl. 273—128 R **5 Claims**



1. A road hockey puck comprising:

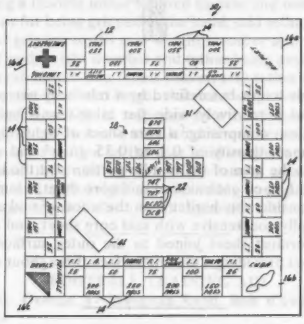
a spool having a female member and a male member, said female member comprising a disc having sleeve means secured thereto, said male member comprising a disc having shaft means secured thereto,
said shaft means having a plurality of leg segments defining a substantially cone-shaped recess,
each of said leg segments having a flange, and
said sleeve means having inclined inner walls to guide said flanged legs and an annular groove positioned therein to hold said flange,
and a resilient arcuate member having an aperture therein surrounding at least a part of said spool and having a diameter greater than said discs.

3,997,165
CHECKERS-LIKE GAME
William Barsky, 5715 Ave. H, Brooklyn, N.Y. 11234
Filed Feb. 27, 1975, Ser. No. 553,525
Int. Cl.² A63F *3/00*
U.S. Cl. 273—131 AB **4 Claims**



1. A game device comprising in combination: a playing board means for providing an upper surface adapted for the moving of playing pieces therealong and for providing a plurality of rows of playing spaces, substantially as shown in FIG. 1, the playing spaces being of two different shape-varieties with consecutive rows off-set in juxtaposition throughout the playing board surface, said two different shape-varieties of playing spaces including a first variety of playing spaces each being of a first predetermined shape and a different second variety of playing spaces each being of a different second predetermined shape as compared to the first predetermined shape; a plurality of playing piece means for providing first and second different-shape types of playing pieces substantially as shown in FIGS. 1, 3A and 3B, the first and second different-shape types of playing pieces being each adapted for being moved along said upper surface and the first and second different-shape types respectively of playing pieces being characterized by different physical properties of appearance the first different-shape type being of a base circumscribing peripheral shape corresponding to and adapted for playing to and from and for resting on solely the first variety of playing spaces and the second different-shape type being of a base circumscribing peripheral shape corresponding to and adapted for playing to and from and resting on solely the second variety of playing spaces, jointly (a) the playing piece means in differing shapes of said first different-shape type and said second different-shape type of playing pieces and (b) the playing board means in respective corresponding differing shapes of said first predetermined shape and the different second predetermined shape, characterizing a first half of each of the first and second different-shape types of playing pieces to be movable in first directions toward a first opposing edge of the playing board means, and further characterizing a second half of each of the first and second playing pieces to be movable to reach a playing space adjacent one of the opposing edges to thereafter be movable in both said first and second directions, and further characterizing each of the first half of playing pieces to be movable in the first direction to an adjacent unoccupied playing space of said first variety and jumpable over any adjacent space of said first variety or said second variety occupied by a playing piece of said first different-shape type or said second different-shape type to an unoccupied playing space of said first variety in any direction other than said second direction, and further characterizing each of the second half of playing pieces to be movable in the second direction to an adjacent unoccupied playing space of said second variety and jumpable over any adjacent space of said second variety or said first variety occupied by a playing piece of said second different-shape type or said first different-shape type to an unoccupied playing space of said second variety in any direction other than said first direction; and said playing spaces of said first variety being substantially square and said playing spaces of said second variety being substantially circular.

3,997,166
BOARD GAME APPARATUS
Geraldo Flores, 3261 Turlock Drive, Costa Mesa, Calif. 92626
Filed Aug. 4, 1975, Ser. No. 601,349
Int. Cl.² A63F *3/00*
U.S. Cl. 273—134 C **4 Claims**



1. An apparatus for playing a game comprising:
a playing board having:
a continuous course extending about the surface of said board;
first means dividing said course into a plurality of segments;
said segments being divided into at least a first group of segments and a second group of segments;
each of said groups of segments being divided into at least a first sub-group of destination segments (items 14 geographically named) and a second sub-group of FI and LI segments (items 14 marked with indicia LI and FI);
said destination segments of each one of said respective first sub-groups alternating with said FI and LI segments of each one of said respective second sub-groups of segments;
each of said destination segments of one of said first sub-groups of segments being marked to represent different geographical destinations;
each of said FI and LI segments of one of said second sub-groups of segments being marked with numerals, and some of said FI and LI segments of said second sub-group being marked FI segments and the remaining of said segments of said same sub-group being marked LI segments with the FI segments alternating with said LI segments;
a supply of simulated aircraft;
said playing board also having markings disposed surrounded by said course;

said markings outlining more than one region on said board so that one of said aircraft can be placed on one of said regions to indicate that said aircraft is in flight to one of said geographical destinations represented by one of said destination segments;

playing pawns for traversing said course;

chance means operable by players of said apparatus for determining the number of segments to be traversed by a playing pawn;

a supply of simulated money;

a stack of FI cards bearing flight instructions on one side thereof so that a player, when his pawn lands on an FI segment, may pick said top FI card, so that his aircraft may be placed in one region of said markings;

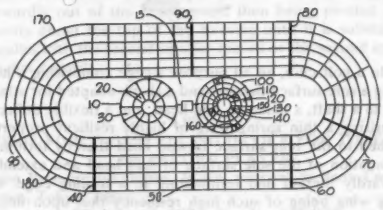
a stack of LI cards bearing landing instructions on one side thereof so that when a player's pawn lands on an LI segment, he may pick said top LI card so that his aircraft may leave said one region to be moved to one of said destination segments of one of said first sub-groups.

3,997,167

GAME OF TRACK AND FIELD SPORTS

Danny Alan Kratzer, Elkhart, Ind., assignor to The Raymond Lee Organization, Inc., New York, N.Y.

Filed Aug. 5, 1975, Ser. No. 601,972
Int. Cl.² A63F 3/00
U.S. Cl. 273—134 CA 1 Claim



1. A game of track and field sports, comprising:

a grease pencil,

a score card indicating a plurality of track and field sports events and means of scoring a plurality of players,

a plurality of simulated runner pieces, whereby a player can indicate the position reached by the player in an event chosen from among dashes, runs, and relays,

a track whereon is marked the path for a plurality of players and is marked a run and relay start and finish mark,

a start mark for the 100 yard dash,

a quarter mile mark,

a finish mark for the 100 yard dash,

a finish mark for the 220 yard dash, &

a three quarter mile mark,

a first spinner marked with concentric rings and random numbers in each ring, whereby a player can determine his moves in run dash and relay events, &

a second spinner marked with concentric rings and random measurements in each ring and marked with a lose turn space, whereby a player can determine his moves in events selected from pole vaults, shot puts, high jumps, and long jumps,

pegs mounted on each spinner, &

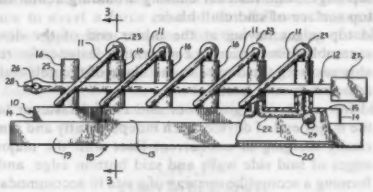
a member fixedly mounted to a field between the spinners having on opposite sides thereof flexible members each engaging one set of pegs, whereby the spinner will be stopped at a particular value.

3,997,168

RING AND CORD PUZZLE

David L. Paige, 2931 Switzer Road, Columbus, Ohio 43219

Filed Aug. 21, 1975, Ser. No. 606,465
Int. Cl.² A63F 9/08
U.S. Cl. 273—159 5 Claims



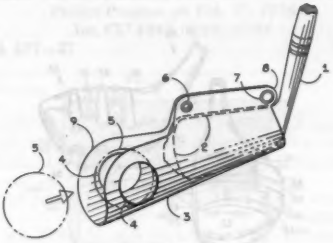
1. A ring and cord puzzle comprising an elongated base having an upper surface and a plurality of upstanding fixed posts projecting a distance above said surface, said posts disposed in longitudinally aligned, spaced relationship, and formed with axially extending bores opening at the upper ends of the posts, a plurality of closed rings with each ring articulately secured to the upper end of a respective post by connector means cooperatively interengaging with the axial bore of a respective post, said rings being of a size to extend around a next adjacent post between the upper and lower ends thereof with at least all of said rings other than one endmost ring extending around a next adjacent post having a ring secured thereto, and an elongated loop having two longitudinally extending side members interconnected at each end of said loop, at least one of said side members being formed from a flexible cord and of a length relative to the other side member to permit manipulation thereof in working the puzzle.

3,997,169

BALL RETRIEVER ATTACHMENT

Harold G. Bergstrom, 85 Wiltshire Road, Scarsdale, N.Y. 10583

Filed Sept. 22, 1975, Ser. No. 615,468
Int. Cl.² A63B 57/00
U.S. Cl. 273—162 E 3 Claims



1. In combination, a golf ball retriever attachment and a golf club having a shaft, a hosel fitting about the free end portion of said shaft, and a tapered metal blade extending from said hosel with a front striking face and a rear face, having a sole adapted to lie parallel to the ground, a top surface tapering outwardly with respect to the sole as it extends from the hosel, and the blade tapering to converge from the sole to the top surface thereof,

said ball retriever attachment comprising, a scoop-like device having an elongated, flexible sheet plastic body in the form of an open ended sleeve, or sheath, tapered in respect to its longitudinal or horizontal axis, of a size to accommodate said blade of a golf club iron within its minor end, and extending longitudinally of the club head and

beyond the free end thereof, of a size and length to hold a golf ball within the major end of said sleeve,

said tapered sleeve having a semi frusto-conical bottom, with side walls having generally plane surfaces which taper upwardly from opposite sides of said bottom to meet in convergence at their matching outermost edges and held in said convergence by a fastener at their medial top edges, said fastener causing a holding action on said top surface of said club blade,

said top edges having at the minor end of the device a separable fastener and a cooperating fastener for removably securing the device to the blade of the golf club iron adjacent to said hosel,

said top edges diverging from said medial fastener toward the major end of device, each independently and symmetrically merging in concurrent lines with the major end edges of said side walls and said bottom edge, and thus forming a scoop-like opening of a size to accommodate the ready scooping of a golf ball from water and the like,

said major end side walls each having a symmetrically disposed holding hole, on a common transverse axis, of a diameter generally less than that of a golf ball, to drain the water scooped up with a golf ball and to engage and hold the golf ball, during and after its retrievement,

said retrievement being accomplished by movement of the device toward the golf ball, with said major end leading the blade of the club, generally parallel to the longitudinal axis of the device, and said blade of the club, positioning of said device varying from close-at-hand retrievement wherein said bottom of the device will be generally parallel to the ground or hazard bed, to maximum reach retrievement wherein one of said side walls of the device will be generally parallel to the ground or hazard bed,

said flexibility of said device and its minimum size and minimum weight enable said device to be readily carried on the user's person or in the pocket of a golf bag without danger of deforming its functional form.

3,997,170

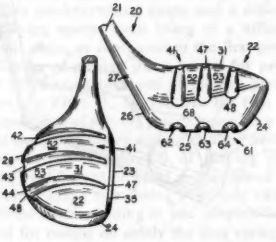
GOLF WOOD, OR IRON, CLUB

Marvin B. Goldberg, 7 Oak Park Circle, Lexington, Mass. 02173

Filed Aug. 20, 1975, Ser. No. 606,081

Int. Cl.² A63B *53/04*

U.S. Cl. 273—164 **7 Claims**



1. A golf club having a head with a front, ball striking face, an upper face with a plurality of grooves and ribs therein, normal to said front face, a lower face with a plurality of grooves and ribs therein, normal to said front face, said club characterized by:

said head having a substantially planar, flat ball striking face with a continuous upper front edge and a continuous lower front edge,

an equal number of grooves in said upper and lower faces, each upper groove being opposite a corresponding lower groove,

each of said grooves being of U-shaped configuration and below the level of its respective upper or lower face, the forward ends of said grooves in said upper and lower faces being located just in rear of said upper and lower front edges of said ball striking face,

said grooves cooperating to reduce resistance to advance of said club head through the air, sand or turf,

the webs between adjacent said grooves forming an equal number of ribs in said upper and lower faces, each upper rib being opposite a lower corresponding lower rib,

each of said ribs being relatively wide, flat and entirely within the confines of its respective upper or lower face,

said ribs cooperating to produce an air foil stabilizer, or rudder-like effect tending to make said club head follow a desired path.

3,997,171

GOLF CLUB WITH SPRING WING DEFLECTOR

Gaylord Lee Currie, 631 Country Plaza S. Gilbert, Tempe, Ariz. 85234

Continuation-in-part of Ser. No. 254,695, May 18, 1972, abandoned. This application Nov. 13, 1975, Ser. No. 631,749

Int. Cl.² A63B *53/04*

U.S. Cl. 273—167 A **9 Claims**

1. In a golf club, an all purpose wedge comprising a head having a sole surface thereon and a shank adapted for attachment to a shaft, a blade on said head, and a flexible deflector comprising a thin spring wing of highly resilient properties attached to the rear surface of said head thereby forming a continuation of the sole surface of said head and extending rearwardly thereof and terminating in a trailing edge, said spring wing being of such high resiliency that upon impact with the ground or turf said wing will undergo a very substantial deflection directly proportional to the force of impact and thereafter recover its original shape, thereby yieldably resisting and absorbing downward movement of the club in direct proportion to said force of impact, the resiliency of said spring wing being such that in normal use, the wing may undergo a deflection, within its elastic limit, of at least one fourth inch for each inch of the distance between its point of attachment to the head and its trailing edge.

3,997,172

RECORD SUPPORT ASSEMBLY FOR A RECORD PLAYER

Christopher Krzysztof Kubisz, Swindon, England, assignor to Plessey Handel und Investments A.G., Gartenstrasse, Switzerland

Filed July 15, 1975, Ser. No. 596,116

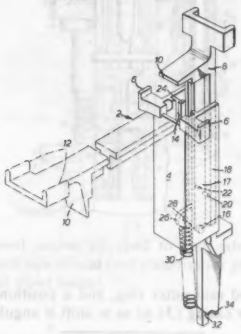
Claims priority, application United Kingdom, Aug. 1, 1974, 33975/74

Int. Cl.² G11B *17/08*

U.S. Cl. 274—10 R **3 Claims**

1. A record edge support assembly for a record player, which comprises (1) an upstanding housing having a fixed support surface for a first record or a first stack of records, and (2) a record stabilizer body adapted to slide up and down in the housing and comprising firstly a clip portion for engaging the upper surface of the first record or the first stack of records, secondly a support surface adapted to engage the

lower surface of a second smaller record or a second stack of smaller records and thirdly pivot means for permitting said stabilizer body to be pivoted about the top of said housing, the record edge support assembly being such that the record stabilizer body is upstanding and substantially retracted down into the housing when the clip portion of the record stabilizer body is in a position operative to press the first record or the first stack of records against the fixed support surface of the housing, and is substantially withdrawn up from the housing



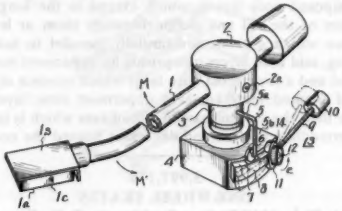
when the support surface of the record stabilizer body is in a position operative to support the second smaller record or the second stack of smaller records; the record stabilizer body being such that it is moved to support the second smaller record or the second smaller stack of records by being pulled upwardly out of the housing and then being pivoted downwardly about the top of the housing until it is substantially parallel with the second smaller record or the second stack of smaller records.

3,997,173

INSIDE FORCE CANCELLING DEVICE FOR TONE ARM OF RECORD PLAYER

Shiro Yasuda, Yokohama, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Oct. 2, 1975, Ser. No. 618,938
Claims priority, application Japan, Oct. 8, 1974, 49-115897
Int. Cl.² G11B *3/10*
U.S. Cl. 274—23 R **10 Claims**



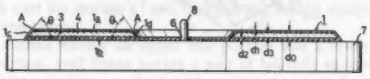
1. In a record player having a tone arm carrying a pickup stylus for tracking a spiral record groove on a record disc as the latter is rotated, apparatus comprising: a tone arm, mounting means for said tone arm permitting said tone arm to turn about an axis perpendicular to the plane of the record disc in response to said tracking, and in which the friction of said stylus in respect to the record disc results in an inside force acting to turn said tone arm in one direction about said axis with the magnitude of said inside force varying in accordance with the position of said stylus in the spiral record groove; and means for cancelling said inside force including cam follower means spaced radially from said axis and coupled with said tone arm to move in an arcuate path about said axis in response to turning of said tone arm, a cam member having a cam surface extending along said arcuate path and being upwardly inclined in respect to the forward direction of movement of said cam follower means in said path, and means mounting said cam member for urging said cam member against said cam follower means for causing said inclined cam surface to exert a force on said cam follower means in the direction opposed to said one direction of turning of said tone arm by said inside force, the inclination of said cam surface being different at spaced apart locations therealong so that said force exerted on the cam follower means is correspondingly varied to counteract said varying magnitude of the inside force.

3,997,174

TURNTABLE MAT

Isao Kawashima, Yachiyo, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Mar. 31, 1975, Ser. No. 563,385
Claims priority, application Japan, Apr. 4, 1974, 49-38332
Int. Cl.² G11B *3/60;* **F16F** *15/04*
U.S. Cl. 274—39 R **16 Claims**



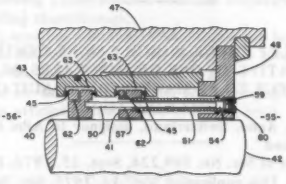
1. A mat for a phonograph record turntable comprising: at least one flexible enclosure defining at least one sealed interior space and adapted to be disposed on a turntable, a fluid material disposed in said space so that said flexible enclosure provides a cushioned, vibration-damping support surface for a phonograph record which conforms to the shape of the latter, said space further containing particles floating in said fluid material.

3,997,175

SHAFT SEAL ASSEMBLY

Carl H. Geary, Greensburg, Pa., assignor to Carrier Corporation, Syracuse, N.Y.

Filed Jan. 24, 1975, Ser. No. 544,034
Disclosure was also published under second Trial Voluntary Protest Program on Feb. 17, 1976
Int. Cl.² F16J *15/16, 15/44*
U.S. Cl. 277—27 **7 Claims**



1. In a shaft seal assembly of the type wherein a high pressure fluid is passed between the shaft and at least one bushing encompassing the shaft, the assembly including

a series of circumferentially spaced beams substantially aligned axially with the shaft, the beams being secured against movement at one end and supporting the bushing in coaxial alignment about the shaft at the opposite end, said beams having a high spring constant in the axial direction to prevent the bushing from being displaced axially by the high pressure fluid and having a relatively lower spring constant in the radial direction to permit the bushing to move radially in compliance with the shaft as the shaft is deflected, and

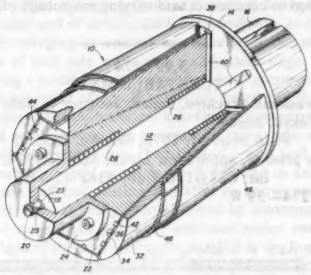
adjusting means operatively associated with the beams for adjusting the axial position thereof.

3,997,176

EXPANSIBLE MANDREL

James A. Wyckoff, Interlaken, and William J. Miller, Ithaca, both of N.Y., assignors to Borg-Warner Corporation, Chicago, Ill.

Filed Sept. 19, 1975, Ser. No. 614,999
Int. Cl.² B23B *31/40*
U.S. Cl. 279—2 R 5 Claims



1. An expansible mandrel assembly which comprises:
a support;
a generally truncated polyhedron-shaped core member movable axially of said support;
said core member having a plurality of generally planar outer surfaces;
a plurality of wedge members each having an inner surface which engages an outer surface of said core member and an outer arcuate surface;
said plurality of wedge members when in concert defining an outer, generally cylindrical surface;
said wedge members each being axially fixed and radially movable with respect to said support;
elastic means surrounding said wedge member maintaining said wedge members in position relative to said core and providing a generally cylindrical outer surface; and
means to axially move said core member relative to said support and to said wedge members whereby to vary the outer dimension of said assembly.

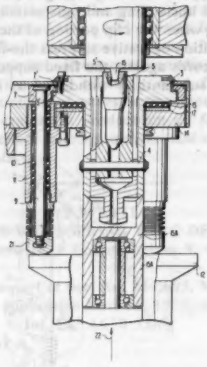
3,997,177

COLLET CHUCK WHICH CAN BE CENTERED RELATIVE TO ONE OR MORE AXES OF THE WORKPIECE TO BE MACHINED AND SUITABLE FOR MACHINE TOOLS

Ugo Buzzi, Agno, Switzerland, assignor to Albe S.A., Agno, Switzerland

Division of Ser. No. 509,224, Sept. 25, 1974, Pat. No. 3,934,890. This application Nov. 12, 1975, Ser. No. 631,050
Int. Cl.² B23B *31/20*
U.S. Cl. 279—16 6 Claims

1. A collet chuck which can be centered relative to an axis of the workpiece to be machined and suitable for machine tools in general and in particular machine tools having a number of successive positions characterized by an inner prehensile member (1) capable of gripping the workpiece, an intermediate member (2) coaxial to the first with a conical seating which slides axially causing the prehensile member (1) to close on the workpiece to be machined (5); an outer casing (3) rigidly attached to the prehensile member (1) by means of a pin (4), an outer ring (7) fitted with radial play around the periphery of outer casing (3), spring members (8) of variable tension to compress the outer casing (3) and outer ring (7) against each other to lock them together by friction, pusher means (9) operable axially by a thrust member to unlock said



outer casing and said outer ring, and a positioner (15) that enters the outer casing (3) so as to shift it angularly.

3,997,178

CROSS-COUNTRY SKI

Georg Altenburg, Andrichsfurt, Austria, assignor to Fischer Gesellschaft m.b.H., Ried im Innkreis, Austria

Filed Mar. 21, 1975, Ser. No. 560,878
Claims priority, application Austria, Mar. 21, 1974, 2351/74
Int. Cl.² A63C *5/00*
U.S. Cl. 280—615 5 Claims

1. A cross-country ski having a scoop formed at a front end thereof, comprising a composite sandwich body which comprises a core, a layer which covers the upper surface of said core, a layer which covers the underside of said core, and a tread covering which covers the layer that covers the underside of said core, said core comprising a plurality of directly superimposed core layers, which extend in the longitudinal direction of the ski and define between them at least one interface which extends substantially parallel to said tread covering, said core layers comprising an uppermost core layer of wood and a lowermost core layer which consists at least in part of foamed material, said uppermost core layer being shorter than the ski and having a thickness which is largest in an intermediate portion and decreases toward the ends.

3,997,179

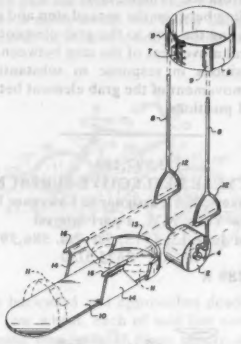
ONE-WHEEL SKATES

Joffre de Blois, 1019 Redfern St., Victoria, B. C., Canada (V8S 4E9)

Filed Oct. 8, 1975, Ser. No. 620,921
Int. Cl.² A63C *17/08*
U.S. Cl. 280—11.24 5 Claims

1. A single wheel roller skate comprising an axle;
a wheel rotatable on the axle;
a post extending upwardly from each end of the axle;
leg attachment means provided with (a) pockets that engage slidably with the posts and with (b) means to enable tightening around the leg of a skater so that the wheel of the skate can be maintained in substantially fixed relationship with the leg of the skater;
a foot platform for supporting the skater's foot;

means to attach the platform to the skater's foot;
first pivot means attached to each post for providing a pivotal axis forwardly of said axle; and

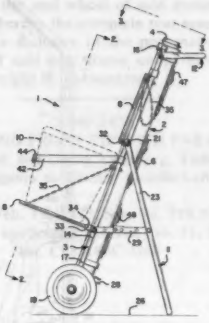


second pivot means attached to and extending upwardly from each side of said foot platform for pivotally engaging said first pivot means.

3,997,180
BABY CARRIAGE
Yoshikazu Okubo, Matsudo, Japan, assignor to Marble Industries Co., Ltd., Matsudo, Japan
Filed June 25, 1975, Ser. No. 590,258
Claims priority, application Japan, Sept. 19, 1974, 49-112934
Int. Cl.² B62B 7/14
U.S. Cl. 280—31 5 Claims

1. A baby carriage comprising a truck having a plurality of wheels thereon, connecting means extending upwardly from said truck, a carriage body having connecting means projecting downwardly therefrom cooperable with said connecting means on said truck for detachably and pivotably mounting said carriage body on said truck, said connecting means cooperating to define a vertical pivot axis means for locking said carriage body on said truck in a selected pivotal position relative thereto, and a ground-bearing frame integral with said carriage body and extending below the connecting means thereon for supporting the carriage body upon a flat surface in a stable manner when said carriage body is detached from said truck.

3,997,181
FISHERMAN'S CART
Wendell J. Jaco, and Freda M. Jaco, both of 7104 E. 67th St., Kansas City, Mo. 64133
Filed Jan. 2, 1976, Ser. No. 646,362
Int. Cl.² B62B 1/26
U.S. Cl. 280—47.19 5 Claims

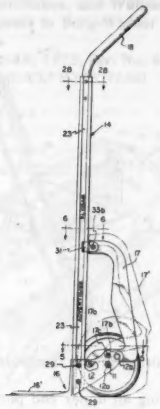


1. A cart for storage of and transporting fishing equipment and comprising:
a. a frame having an upper end portion and a lower end portion, said frame having a pair of laterally spaced upright members, each of said upright members having a plurality of longitudinally spaced brackets mounted thereon, said brackets being arranged in pairs of brackets in opposed relation;
b. wheel means mounted on the lower end portions of said frame whereby said frame is mobile;
c. a support member having one end portion thereof mounted on said frame intermediate the end portions thereof, said support member having the other end portion thereof adapted to engage a support surface;
d. means extending between and connecgted to said frame and to said support member for holding said support member in position for supporting said frame;
e. a plurality of shelf members longitudinally spaced along said frame for supporting items thereon;
f. an elongated hinge pin for each of said shelf members extending between and having opposite end portions thereof mounted on said brackets of said respective pair of opposed brackets, said shelf members each being reticulated members having a plurality of laterally spaced rods each having a loop portion with said respective hinge pin extending therethrough;
g. a body member mounted on said frame and having means therein for receiving and storing therein elongated articles in the nature of fishing rods; and
h. means on said body member for receiving and storing therein articles in the nature of fishing reels.

3,997,182
TWO-WHEELED HAND TRUCKS
Carl N. Mortenson, Midland, Mich., assignor to Magline, Inc., Pinconning, Mich.
Filed May 27, 1975, Ser. No. 581,212
Int. Cl.² B62B 5/02
U.S. Cl. 280—47.27 18 Claims

1. In a two-wheeled hand truck or dolly structure including: a pair of wheels; a primary frame, adapted in use to assume a generally vertical position, supported by said wheels; a generally forwardly disposed nose part supported by said wheels and connected to project forwardly from the primary frame to receive an object to be carried thereon; said frame at its upper end incorporating a handle portion which can be grasped by the users to propel the truck, along with the product carried

by the nose part resting back against the primary frame; said frame comprising an open framework with side rails connected by cross rails; the improvement wherein at least one of said side and cross rails is formed with an exposed generally T-shaped slot of predetermined depth extending from end to end thereof and comprising an enlarged width head portion



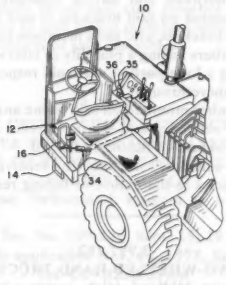
defined by projecting flanges and a reduced width neck portion; and an elongate semi-rigid strip bearing information of an advertising or identifying character on its outer face and of a thickness less than the depth of said slot is received by the head portion of the slot and secured in recessed protected position in the slot.

3,997,183

STEP-GRAB ELEMENT SYSTEM FOR A VEHICLE

James W. Russey, Decatur, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Sept. 22, 1975, Ser. No. 615,650
Int. Cl.² B60R *3/02*
U.S. Cl. 280—166 **6 Claims**



1. Apparatus for ascending to or descending from an elevated location on a vehicle, comprising:

at least one step pivotally connected to the vehicle for rotation about a horizontal axis and being movable along a substantially vertical pathway between a first, protected position at which the step is extending along the vehicle and a second, usable position at which the step is extending outwardly from the vehicle;

a grab element pivotally connected to the vehicle at a location spaced from the step and being movable about a vertical axis and along a substantially horizontal pathway between a first, protected position at which the grab element is extending along the vehicle and a second usable position at which the grab element is extending outwardly from the vehicle; and

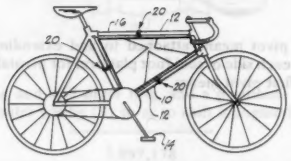
means extending between the spaced step and grab element and connecting the step to the grab element for substantially vertical movement of the step between the first and second positions in response to substantially vertical rotational movement of the grab element between its first and second positions.

3,997,184

BICYCLE REFLECTIVE SURFACE

Alfred Riti, Yonkers, N.Y., assignor to Lawrence Peska Associates, Inc., New York, N.Y., a part interest

Filed June 13, 1975, Ser. No. 586,597
Int. Cl.² B62J *5/20*
U.S. Cl. 280—289 R **4 Claims**



1. An attachment for a bicycle having a frame of intersecting structural members including a top horizontal bar, a downwardly extending seat bar, an upwardly extending bar connecting said seat bar to a forward wheel steering bar, which comprises:

a. at least three generally planar reflective members, each said member of a generally trapezoidal configuration; and

b. two bracket members affixed to each said reflective member, one said bracket affixed to one side of said reflective member, another said bracket affixed to another side of said reflective member, said another side steering bar, said brackets of said third reflective members each said bracket having an arcuate section and an elongated generally planar member, said generally planar member affixed to said side of said reflective member by screw and nut means, said brackets of said first reflective member engaging said top horizontal bar and said seat bar, said brackets of said second reflective member engaging said top horizontal bar and said forward wheel steering bar, said brackets of said third reflective members engaging said upwardly extending bar, said first, second, and third reflective members extending inwardly into an opening defined by said seat bar, said wheel bar, said upwardly extending bar, and said top horizontal bar.

3,997,185

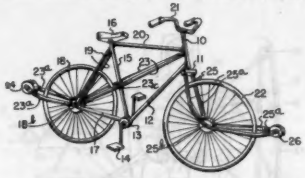
BICYCLE FRAME

Salvatore C. Parrilla, 6198 Stratford Drive, Parma Heights, Ohio 44130

Filed Oct. 10, 1975, Ser. No. 621,279
Int. Cl.² B62D *61/12*
U.S. Cl. 280—289 G **4 Claims**

1. In a bicycle frame for supporting a single front wheel on an axial shaft and a single rear wheel on an axial shaft, comprising a head tube and front fork, a down tube extending from said head tube to a bottom bracket, a seat support tube extending from said bottom bracket at an acute angle to said down tube and having a seat support at its upper end, a pair of chain stays extending substantially horizontally backward from said bottom bracket, and a back fork extending downwardly and rearwardly from a point on said frame near said seat support to the axis of said rear wheel, all of said afore-

mentioned parts being rigidly secured together; the improvement consisting of two generally parallel integral tubular members extending from said head tube past said seat support tube and then past the axis of said rear wheel and then beyond rearwardly to a point which will touch the ground when the center of gravity of a rider's body, riding on the rear wheel



only, moves backward and approaches dead center over the axis of said rear wheel, each of said last named two tubular members being one integral piece rigidly and permanently attached to said head tube and to one side of said seat support tube and rigidly and detachably secured at one of the opposite ends of said rear wheel axial shaft.

3,997,186

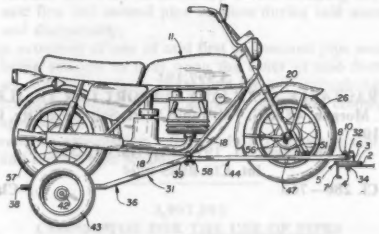
MOTORCYCLE TOWING DEVICES OF FIFTH WHEEL TYPE

Marsh Pottorff, 1050, 36½ Lane, Pueblo, Colo. 81006

Continuation-in-part of Ser. No. 503,712, Sept. 6, 1974, abandoned. This application June 23, 1975, Ser. No. 589,735

Int. Cl.² B62D *53/04*

U.S. Cl. 280—402 **11 Claims**



1. A fifth wheel type of towing device for trailing motorcycles behind a towing vehicle wherein the motorcycle has a main frame associated with the pneumatic tired rear wheels thereof and a front assembly inclusive of front forks and wheel that normally moves pivotally with respect to said main frame comprising a turn plate for disposition on the towing vehicle and providing a flat surface disposed in a horizontal position, a bolster element positioned for contact with the flat surface of said turn plate, a king bolt at a normal disposition with respect to said turn plate and bolster and providing a vertically disposed turning axis for permitting relative rotation between said turn plate and bolster about said vertical axis, journals on said bolster establishing a horizontal turning axis adjacent said turning plate and king bolt, a pivot support element for engagement to said journals and providing therewith rotational freedom of movement about the journal axis, a first frame element for said towing device extending rearwardly from said pivot support with said first frame element, accordingly, being rotatably movable about the journal positioned horizontal axis and the king bolt positioned vertical axis, clamp means for interengaging said first frame element and the main frame of said motorcycle whereby the main frame of said motorcycle is constrained to move with said first frame element, means constraining the front assembly of said motorcycle to prevent the normal pivotal movements thereof whereby the motorcycle is constrained to follow said pivot support, a rear frame for said towing device, a cross pivot for pivotally interconnecting said first frame element and said rear frame, support wheels for said rear frame to provide a trailing device of trailer configuration, and means on said rear frame for engagement beneath the rear tire and wheel of said motorcycle for the support thereof whereby the complete rear suspension system of said motorcycle inclusive of the pneumatic tire and the support wheels of said rear frame cooperatively withstand road shocks that might be encountered.

3,997,187

SNOW SKI HAVING FRONT TIP WITH PARALLEL SIDES

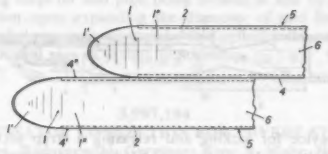
Adolf Staufer, Ried, and Georg Altenburg, Andrichsfurt, both of Austria, assignors to Fischer Gesellschaft m.b.H., Innkreis, Austria

Filed Feb. 19, 1975, Ser. No. 550,939

Claims priority, application Austria, Feb. 21, 1974, 1420/74

Int. Cl.² A63C *5/00*

U.S. Cl. 280—609 **2 Claims**



1. A snow ski comprising an elongated body which is defined by a top surface, a bottom tread surface provided at its sides with steel edges, and side faces, said body having at its leading end an upwardly curved solid scoop having a rounded peripheral tip portion, which is tapered in width and curved according to a continuous arc having an average radius of 20–25 mm, said arc merging continuously into a scoop root portion which has parallel side faces.

3,997,188

SAFETY SKI BINDING

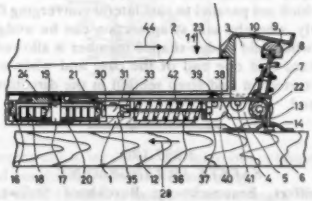
Jean-Marie Begey, Cluses, France, assignor to Garcia Corporation, Teaneck, N.J.

Filed Sept. 23, 1975, Ser. No. 615,900

Claims priority, application France, Oct. 14, 1974, 74.34524

Int. Cl.² A63C *9/08*

U.S. Cl. 280—613 **8 Claims**



1. A safety ski binding comprising:

a boot sole gripping member pivotally supported at one end of a sole-supporting plate, said sole-supporting plate being elastically retained to a ski by a safety release device, said device including at least one flexible cable continuously tensioned by a cable tensioning device incorporated in said plate;

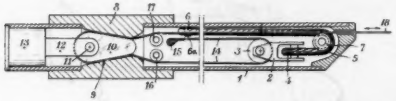
means for automatically opening said boot sole gripping member after operation of said safety release device comprising a movable actuating member operatively associated with said cable tensioning device, and transmission means carried by said plate and having an actuator element constructed and arranged to engage said actuating member at a predetermined position on the path of movement of said actuating member to cause said gripping member to pivot to an open position before the limit of movement of said sole-supporting plate relative to said ski.

3,997,189

SAFETY WEBBING

Pierre de Bosredon, 17 rue Millet, 24100 Bergerac, and Andre Cosset, 5 rue Claude Lebret, 93460 Gournay sur Marne, both of France

Filed July 2, 1975, Ser. No. 592,598
Claims priority, application France, July 4, 1974, 74.23591
Int. Cl.² B60R 21/10
U.S. Cl. 280—744 5 Claims



1. Device for locking and releasing a strap section of a safety belt, notably of the type used for passengers of motor vehicles, which comprises: a case open at one end and having a pair of opposed flat walls converging towards said one end thus forming a longitudinal channel of a width decreasing gradually towards said one end in order to form thereat a passage of minimum width, a wedge-shaped movable member adapted to slide freely in said channel and to be wedged when it slides towards said one end, said wedge-shaped member having two opposed flat faces converging towards said one end with the same convergence as said channel-forming flat walls, said last mentioned flat faces being interconnected by a rounded face, one end of the strap section to be locked and released penetrating into said case through an aperture formed at said one end and into said channel through said minimum-width passage, said strap thus forming a loop around a first lateral converging face, the rounded cylindrical face and the other lateral converging face of said movable wedge-shaped member, and emerging from said channel through the same minimum-width passage, and means for causing said movable wedge-shaped member to slide toward the other end of said case and thus unwedge said strap section wedged between the lateral converging flat faces of said wedge-shaped member and said opposed flat walls of said channel which are parallel to said lateral converging flat faces, respectively, whereby said strap section can be wedged automatically when said wedge-shaped member is allowed to slide freely toward said one end of the case and when a tractive effort is exerted on said strap section in the direction toward said one end.

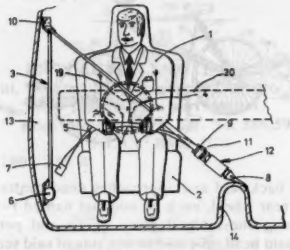
3,997,190

SAFETY ARRANGEMENT

Ulrich Seiffert, Braunschweig; Burckhard Strüwe, Fallersleben; Hannu Paitula, Wolfsburg, and Gunnar Borenius, Schanbach, all of Germany, assignors to Volkswagenwerk Aktiengesellschaft, Wolfsburg, Germany

Filed Oct. 11, 1973, Ser. No. 405,502
Claims priority, application Germany, Oct. 11, 1972, 2249732
Int. Cl.² B60R 21/02
U.S. Cl. 280—747 11 Claims

1. A safety belt arrangement for a vehicle, such as a motor vehicle, comprising at least a shoulder safety belt for retaining a vehicle occupant with respect to a seat and abrupt releasing means associated with the safety belt for instantaneously releasing a single predetermined length of belt upon transmission to the releasing means of any tensile force exceeding a predetermined force, when the safety belt is securely engaging the occupant of the seat, to elongate the safety belt without automatically retracting the predetermined length of belt



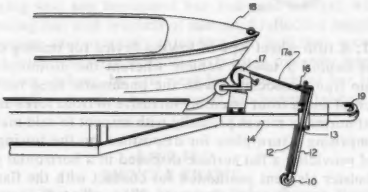
thereafter, said predetermined length of belt being so arranged and of such measure, with respect to the occupant space of the vehicle, as to permit the entire body of the occupant to float forward out of the seat without substantial restraint from the belt for an available distance within said space and to then be restrained by the safety belt at its elongated length, thereby preventing a nodding motion of the occupant's head upon sudden deceleration.

3,997,191

RETRACTABLE AUXILIARY SUPPORT FOR TRAILERS

W. F. Morgan, 4556 S. Thirteenth West, Salt Lake City, Utah 84107

Filed Sept. 11, 1975, Ser. No. 612,337
Int. Cl.² B60S 9/04
U.S. Cl. 280—763 5 Claims



1. A retractable auxiliary support for a trailer having a tongue and associated winch means, comprising:

a leg support member with a first bifurcated end adapted to straddle the trailer tongue and a second end carrying a base support member;

a castor wheel mounted to said base support member;

a mounting bracket connected to said leg support member by an axle extending through said bifurcated first end so that said leg support is adapted to pivot around said bracket, the bracket constituting means for attaching the axle transverse and beneath the trailer tongue; and

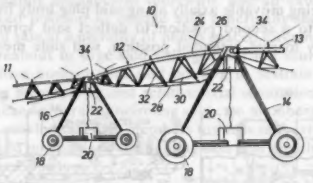
means for connecting said bifurcated end to said winch associated with said trailer tongue.

3,997,192

UNIVERSAL COUPLING FOR MOVABLE IRRIGATION PIPES

James E. Hansen, Lubbock, Tex., assignor to Gifford-Hill & Company, Inc., Dallas, Tex.

Filed Feb. 27, 1975, Ser. No. 553,801
Int. Cl.² B05B 15/00
U.S. Cl. 285—5 18 Claims



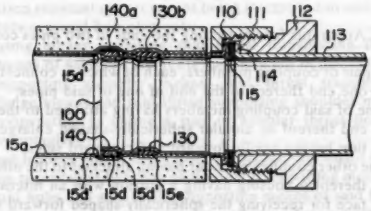
1. A universally movable coupling for irrigation pipes, said coupling comprising:
first and second pipe sections;
a connector projection extending transversely from first pipe section in transverse relation to the path of fluid flow through said first pipe section;
said second pipe section being formed to define a connection aperture in the wall structure thereof, said connection aperture being adapted to receive said connector projection therein, at least one of said first and second pipe sections being formed to define clearance means allowing relative vertical movement between said connector projection and said connection aperture for assembly and disassembly of said pipe sections with the axes of said pipe sections remaining in substantially parallel relation and with no linear separation occuring between said first and second pipe sections during said assembly and disassembly;
one extremity of one of said first and second pipe sections being adapted to bear upon the other of said first and second pipe sections, the weight thereof maintaining said connector projection in assembly with said connection aperture; and
means for establishing a fluid tight seal between said first and second pipe sections.

3,997,193

CONNECTOR FOR THE USE OF PIPES

Yoshikuni Tsuda; Osamu Onishi; Yasuo Mizohata; Ryozo Ota, and Hiroshi Murakami, all of Sakai, Japan, assignors to Kubota Ltd., Osaka, Japan

Filed Dec. 9, 1974, Ser. No. 531,004
Claims priority, application Japan, Dec. 10, 1973, 48-140130; Apr. 30, 1974, 49-49163; May 17, 1974, 49-55955; May 30, 1974, 49-61555; Mar. 29, 1974, 49-36755[U]; May 30, 1974, 49-62798[U]
Int. Cl.² F16L 11/12
U.S. Cl. 285—47 7 Claims



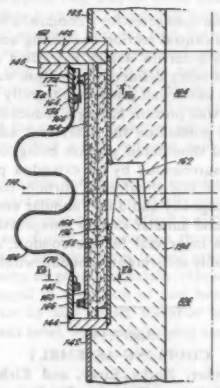
1. A connector for connecting the end of a pipe with another element comprising a cylindrical member having a first cylindrical section having a first radial ring means and a second cylindrical section having a second radial ring means, said first radial ring means being longitudinally spaced from said second radial ring means, said cylindrical member also having a third cylindrical section having a radial flange at the longitudinal end thereof, said first and second cylindrical sections along with at least a portion of said third cylindrical section being disposed with said pipe, a first circular protruding ring circumscribing said pipe, a second circular protruding ring circumscribing said pipe, said first radial ring means comprises a first circumscribing indentation in said first cylindrical section and an injection ring disposed in said first circumscribing indentation, said second radial ring means comprising a second circumscribing indentation in said second cylindrical section and a packing ring disposed in said second circumscribing indentation, said injection ring being at least partially disposed in abutting relationship with said first circular protruding ring circumscribing said pipe, said packing ring being at least partially disposed in abutting relationship with said second circular protruding ring circumscribing said pipe, said packing ring being disposed in sealing relationship with said second circular protruding ring, said first and second circular protruding rings on said pipe being formed in situ by plastic deformation upon expanding the diameter of said first and second radial ring means, whereby said cylindrical member is secured to said pipe in sealing relationship.

3,997,194

COMPENSATOR CONNECTION FOR TUYERE STOCK

Gerd Eifer, Radevorwald, Germany; Rene N. Mahr, Howald-Hesperange, and Pierre Mailliet, Luxembourg, both of Luxembourg, assignors to S.A. des Anciens Etablissements Paul Wurth, Luxembourg, Luxembourg

Filed Sept. 5, 1975, Ser. No. 610,659
Claims priority, application Germany, Dec. 14, 1974, 2459180
Int. Cl.² F16L 51/02, 59/14
U.S. Cl. 285—53 9 Claims



1. An expansion joint device for interconnecting refractory lined fluid conducting conduits comprising:
an open ended bellows, said bellows having a mean inner diameter in excess of the outer diameter of the conduits to be coupled;
means mechanically connecting respective ends of said bellows to the exterior of the conduits to be coupled, said connecting means and bellows cooperating to render the joint between the conduits hermetic;
at least a first generally annular protective layer of refractory material, said first protective layer bridging the joint between the facing ends of the conduits;

a rigid shielding tube, said shielding tube being coaxial with said bellows and the conduits to be coupled when the conduits are in a normal undeflected condition, said shielding tube being positioned within said bellows and radially outwardly with respect to said first protective layer, said shielding tube normally extending axially in both directions with respect to the joint between the conduits;

stop means extending inwardly from each of said bellows connecting means, said stop means being spaced toward the joint between the conduits from the point of attachment of said connecting means to the conduits; and

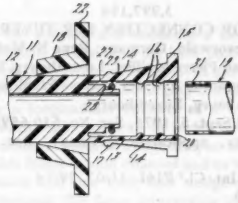
a pair of spatially displaced motion limiting means extending outwardly from said shielding tube, said motion limiting means being separated by a distance which is greater than the spacing between said stop means, said motion limiting means cooperating with said stop means to limit the maximum axial width of the joint.

3,997,195

NON-THREADED TUBING CONNECTOR

Donald D. Bartholomew, Marine City, Mich., assignor to Merit Plastics, Inc., East Canton, Ohio

Filed June 5, 1975, Ser. No. 584,143
Int. Cl.² F16L *35/00*
U.S. Cl. 285—81 **9 Claims**



1. In a releasable connector for a conduit, a body of flexible material having a central section containing an axial passageway about which a narrow axially extending annular slot is provided said slot being defined by a bottom wall and radially spaced inner and outer wall portions integrally formed in said body, said inner wall portion having a reduced portion forming a shouldered portion on the outer end, said annular slot and said reduced shouldered portion being disposed within and completely surrounded by an extended portion of said body, an O-ring on said shouldered portion, the conduit having a mating passageway and a thin annular end wall which is extendable into said annular slot for compressing said O-ring and providing an inner seal for the conduit, and threadless means for releasably securing the conduit within said connector.

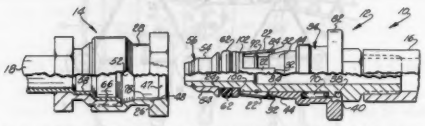
3,997,196

COUPLING ASSEMBLY

Thomas D. Karcher, Rocky River, and Richard J. Silagy, Parma, both of Ohio, assignors to The Hansen Manufacturing Co., Cleveland, Ohio

Filed Jan. 20, 1975, Ser. No. 542,172
Int. Cl.² F16J *15/00*; F16L *55/00*
U.S. Cl. 285—86 **11 Claims**

1. A coupling assembly for connecting a pair of conduits in fluid communication, said coupling assembly comprising a socket, said socket including surface means for defining a socket chamber having a central opening and a stop surface within said socket chamber, a plug body adapted to be telescopically received in said socket chamber, a plurality of spring fingers resiliently deflectable outwardly from a retracted position adjacent to said plug body to an extended position spaced from said plug body, said spring fingers being movable through said central opening during movement of said plug body into said socket chamber with said spring fingers in said retracted position, said spring fingers having outer end portions engageable with said stop surface to retain said plug body in said socket chamber when said spring fingers are in the extended position, and slide means disposed on said plug body for deflecting said spring fingers outwardly from said retracted position to said extended position upon insertion of said plug body into said socket chamber, said slide means being movable axially along said plug body from a first position to a second position to deflect said spring fingers outwardly to said extended position, said slide means being



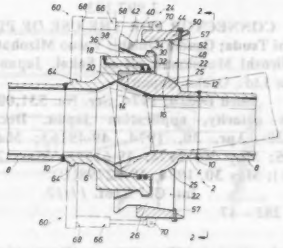
movable axially from said second position to said first position to release said spring fingers for movement from said extended position to said retracted position under the influence of their own natural resilience, an axially outer end portion of said slide means being disposed in said socket chamber between said spring fingers and said plug body when said slide means is in said second position and said plug body is disposed in said socket chamber, said slide means having a manually engageable portion disposed outside of said socket chamber when said slide means is in said second position, said manually engageable portion of said slide means being movable axially along said plug body to effect movement of said slide means from said second position to said first position.

3,997,197

BALL AND SOCKET PIPE COUPLING

Gerald A. Marsh; Eugene O. Lee; James A. Burton, and Raymond E. Latham, all of Houston, Tex., assignors to HydroTech International, Inc., Houston, Tex.

Filed Oct. 8, 1974, Ser. No. 513,056
Int. Cl.² F16L *35/00*
U.S. Cl. 285—93 **9 Claims**



1. Apparatus for connecting the ends of two pipes comprising:

a pair of coupling members, each of which is connectible at one end thereof to the end of one of said pipes;

one of said coupling members having attached to the other end thereof an annular spherically-shaped enlarged portion having axially forward and rearward sides;

the other coupling member having attached to the other end thereof a housing having a portion with an internal surface for receiving the spherically-shaped forward side of said enlarged portion in mating engagement therewith, thereby enabling the central axes of the respective cou-

pling members to be inclined at an angle relative to each other for connecting similarly inclined pipe ends;

seal means supported by one of said enlarged portions and said housing for providing a seal therebetween in the assembled condition;

a plurality of cam members supported by said housing in circumferentially disposed relation thereabout and pivotally movable between a retracted position to permit said receiving portion of said housing to freely receive the spherically-shaped forward side of said enlarged portion in mating engagement therewith, and an extended and locked position to engage said spherically-shaped rearward side at a plurality of points spaced circumferentially thereabout to urge said enlarged portion into continual positive contact with said housing to restrain said coupling members against relative axial separation;

and means generally encircling said cam members for pivotally moving said cam members towards said extended and locked position and for holding said cam members in said locked position.

3,997,198

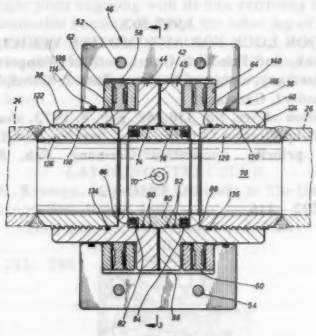
SWIVEL JOINT CONSTRUCTION FOR PRESSURE CONTAINING CONDUIT

Morris B. Linder, 7525 Park Place - 121, Houston, Tex. 77017

Filed Feb. 27, 1975, Ser. No. 553,892

Int. Cl.² F16L *27/00*

U.S. Cl. 285—98 **18 Claims**



1. A swivel joint construction for movable flow lines, said swivel joint construction comprising:

a pair of hub elements each having an opening formed therein, said elements cooperating to define flow passage means through said swivel joint and to define internal seal recess means, said hub elements being rotatably related;

means for interconnecting said hub elements with a flow line;

thrust transmitting flange means being provided on each of said hub elements, said thrust flange means being positioned in juxtaposed relation and defining a joint therebetween;

friction resistant spacer means being interposed in said joint between said hub elements;

housing means enclosing said thrust transmitting flange means of said hub elements and defining opposed thrust supporting shoulder means, said thrust transmitting flange means and said thrust supporting shoulder means cooperating to define a pair of annular thrust bearing receptacles;

thrust bearing means being disposed within said thrust bearing receptacles between said thrust transmitting means of said hubs and said thrust supporting means of said housing means, said bearing means providing for said relative rotation of said hub elements and transmitting pressure induced thrust loads from said hub elements to said thrust supporting means of said housing means; and

elongated annular transition seal means being disposed within said seal recess means and establishing fluid tight seals with each of said hub elements, said transition seal means bridging said joint.

3,997,199

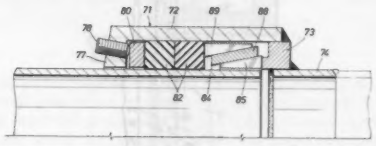
PIPE COUPLING

James F. Arnold, Houston, Tex., assignor to HydroTech International, Inc., Houston, Tex.

Filed Mar. 3, 1975, Ser. No. 554,604

Int. Cl.² F16L *21/06*

U.S. Cl. 285—322 **1 Claim**



1. In pipe coupling apparatus, the combination comprising:

a housing having an open axial end for telescopically receiving the plain end of a pipe to which connection is to be made;

a first split gripping ring mounted in said housing having an outer cam surface tapered radially inwardly toward said open housing end and an inner generally cylindrical gripping surface having teeth for gripping said plain pipe end;

a second split gripping ring mounted in said housing and having an inner axially tapered cam surface and an outer generally cylindrical gripping surface having teeth for gripping the internal surface of said housing;

an annular frusto-conical shaped annular split bowl mounted in said housing and axially movable relataive to said gripping rings and said housing, said bowl having an outer tapered camming surface engageable with said second gripping ring and an inner axially tapered camming surface mateably engageable with the outer tapered surface of said first gripping ring, for camming said first gripping ring inwardly to grip said pipe and said second gripping ring outwardly to grip said housing when said bowl is moved axially relative thereto;

annular seal means mounted in said housing axially adjacent said bowl for engaging said pipe upon axial compression thereof ,to effect a seal between said housing and said pipe;

an axially movable annular thrust member mounted axially adjacent said seal means for axially compressing said seal means against said bowl to effect a seal as aforesaid, said seal means, during compression thereof, causing movement of said gripping rings to said gripping positions;

and a plurality of generally axially extending bolts threadably engaged in a portion of said housing for applying axial force to said thrust member to move said seal means, said bowl, and said gripping rings as aforesaid.

3,997,200

SLIDE BOLT LATCH FOR SLIDING WINDOW VENT

Roscoe M. Brown, Seattle, Wash., assignor to Belknap Glass Company, Seattle, Wash.

Filed May 21, 1975, Ser. No. 579,304

Int. Cl.² E05C *1/04*

U.S. Cl. 292—145 **13 Claims**

1. In a vent frame adapted to slide along a vent guideway formed in a window frame having an aperture therein, a vent latch comprising:

a latch guideway formed in said vent frame having a slide axis arranged to register with said aperture when the vent frame is in a preselected position;

a slide bolt in said latch guideway and interfitting with said vent frame to slide along said slide axis;

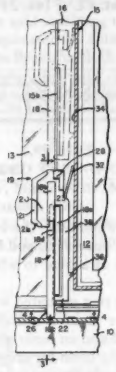
a retaining stop formed in said latch guideway;

a latching member carried by said bolt, said latching member having a projection adapted to interact with said stop when the bolt is in registering position with said aperture;

resilient means for yieldingly urging said projection into engagement with said stop;

a handle; and

means for translating a manual bolt retracting force exerted on said handle in a direction away from said aperture into an unlatching force component opposed to said resilient



means whereby said projection is disengaged from said stop responsive to commencement of retraction of the bolt, said force-translating means including anchoring means on said latching member for limiting relative movement between said latching member and said bolt along said slide axis and permitting limited movement of the latching member toward and away from the back of said latch guideway at said resilient means, said resilient means reacting against said vent frame at the back of said latch guideway and said retaining stop being located at the front of said latch guideway whereby said projection is disengaged from said stop responsive to commencement of retraction of the bolt.

3,997,201

APPLIANCE DOOR LATCH

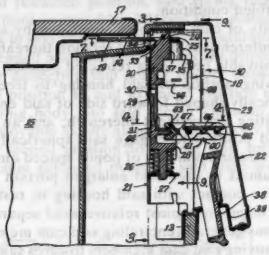
Clifford L. DeSchaaf, and Ray W. Spiegel, both of Stevensville, Mich., assignors to Whirlpool Corporation, Benton Harbor, Mich.

Filed July 9, 1975, Ser. No. 594,452

Int. Cl.² E05C *1/06*

U.S. Cl. 292—173 **21 Claims**

1. In an appliance having a cabinet defining an opening selectively closed by a door, and electrical apparatus therein, improved structure for releasably latching the door in a closed position across said opening and permitting operation of the electrical apparatus only when said door is latched in said closed position, comprising: a strike carried by the cabinet; a bolt movably carried by the door; a switch carried by the bolt for movement therewith for controlling electrical operation of said electrical apparatus; means for releasably biasing the bolt toward a latching position preselected to provide engagement between the strike and bolt as the door is brought to said closed position; abutment means on said strike and bolt causing movement of the bolt against the action of said biasing means as a result of said engagement, said abutment means being arranged to release said bolt for biasing by said biasing means to said latching position when the door is in the closed position; actuating means on said strike for actuating said switch, said biasing means causing said switch to be actuated by said actuating means when said bolt is released with the door in said closed position; cooperating means on said strike



and bolt for releasably holding the door in said closed position with said bolt in said latching position and said switch being actuated; and manually operable means for moving said bolt for selective release of said strike and switch.

3,997,202

DOOR LOCK FOR AUTOMOTIVE VEHICLE

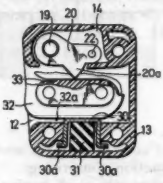
Albert Tack, and Friedrich Gabel, both of Wuppertal-Ronsdorf, Germany, assignors to Firma Tack & Gabel, Wuppertal-Ronsdorf, Germany

Continuation of Ser. No. 330,488, Feb. 8, 1973, abandoned. This application Oct. 15, 1974, Ser. No. 514,894

Claims priority, application Germany, Feb. 8, 1972, 7204613

Int. Cl.² E05C *3/26*

U.S. Cl. 292—216 **8 Claims**



1. A door lock assembly for an automotive vehicle provided with a post on the vehicular frame and a door with a post-confronting surface, comprising:

a locking wedge fixedly mounted on said post;

a keeper on said post-confronting surface of said door at the level of said wedge, said keeper having a pocket with an insertion end for said wedge and an exposed sidewall formed with a guide channel registering with said pocket, said guide channel being bounded by parallel upper and lower edges, said wedge including an indented plate receivable in said pocket, an outer plate secured to said post and an intermediate body of lesser height than said plates sandwiched therebetween for introduction into said channel;

catch means in said keeper engageable with said indented plate;

control means for said catch means in said door; and

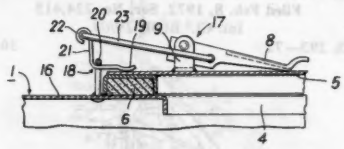
play-equalization means in said body elastically engaging said parallel upper and lower edges upon introduction of said body into said channel.

3,997,203

QUICK-ACTING LOCKING DEVICE FOR THE DETACHABLE CONNECTION OF A REMOVABLE HOUSING ELEMENT

Heinz Fachbach, Graz, Austria, assignor to Hans List, Graz, Austria

Filed Aug. 4, 1975, Ser. No. 601,650
Claims priority, application Austria, Aug. 5, 1974, 6407/74; Sept. 17, 1974, 7509/74
Int. Cl.² E05C 5/02
U.S. Cl. 292—247 6 Claims



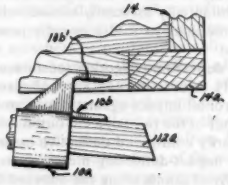
1. A quick-acting locking device for the detachable connection of a removable housing element, in particular of a maintenance cover, with a stationary housing element, comprising at least one cocking lever hinged to the removable housing element, a retaining clip attached to the stationary housing element and protruding therefrom, an essentially flexurally stiff angle plate suspended in the said retaining clip, one of the legs of the angle plate engaging with its free extremity the border of the removable housing element, the other leg of said angle plate protruding outwardly, a bent spring clasp, one end of the clasp being hinged to the outwardly protruding leg of said angle-plate, and the other end of the clasp being hinged to said cocking lever.

3,997,204

LATCHING STRUCTURE

Stanley G. Krempp, Jasper, Ind., assignor to The United Cabinet Corporation, Jasper, Ind.

Filed Jan. 23, 1975, Ser. No. 543,261
Int. Cl.² E05C 1/04
U.S. Cl. 292—288 3 Claims



1. A latching structure selectively interconnecting a door and a doorframe comprising a first portion slideably received on an edge of said door and movable along said edge from a non-latching position to a latching position when said door is closed, and a second portion extending in the direction of movement of the latching structure along said edge grasping an edge of said doorframe when said first portion is at said latching position.

3,997,205

CABINET DOOR CLIP

Kenneth A. MacDonald, 251 York St., Canton, Mass. 02021

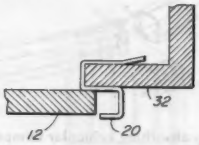
Filed July 7, 1975, Ser. No. 593,265
Int. Cl.² E05C 1/04
U.S. Cl. 292—288 6 Claims

1. A clip for locking a hinged door to a fixed frame wherein the door is larger than the opening in said frame and bears against the outer face of said frame when in a closed position, comprising

a. a unitary structure of a stiff resilient material formed with a pair of adjacent, coplanar oppositely facing and substantially rectangular U-shaped bends,

b. one of said bends including a relatively short, straight outer leg adapted to engage the outer marginal face of said door,

c. a first straight cross-piece extending at one end perpendicularly from said outer leg and adapted to engage the edge of said door,



d. a straight medial common leg of a length substantially in excess of said outer leg extending at one end from the opposite end of said cross-piece parallel to said outer leg,

e. a second straight cross-piece at a substantial distance from the free end of said short outer leg and extending at one end perpendicularly from the opposite end of said common leg in coplanar parallel relation to said first cross-piece,

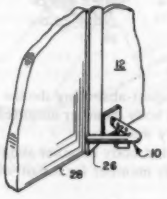
f. a relatively straight long inner leg coplanar to said outer leg and extending in a direction opposite thereto from the other end of said second cross-piece, the length of said inner leg exceeding that of said common leg, said inner leg adapted to engage the inner face of said frame.

3,997,206

PORTABLE SECURITY LOCKING DEVICE

Wayne N. Hagopian, 93 Crescent Ave., Cliffside Park, N.J. 07020

Filed Nov. 13, 1975, Ser. No. 631,846
Int. Cl.² E05C 19/18
U.S. Cl. 292—290 6 Claims



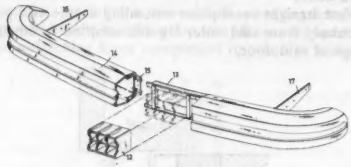
1. A portable security locking device comprising an engagable bracket for encompassing a door having a doorframe, an elongated lock bar on said bracket having a plurality of apertures along its length and a telescopic extension longitudinally movable on said lock bar having alignable apertures and a locking means threaded through predetermined aligned apertures of said lock bar and extension, with referred to extension having means for positive contact of the doorframe, when said extension is locked in the predetermined position of said lock bar, thereby preventing the door from being opened.

3,997,207

CELLULAR SECTION FOR SHOCK ABSORPTION

Stig Ivar Norlin, Trollhattan, Sweden, assignor to Saab-Scania Aktiebolag, Sodertalje, Sweden

Filed July 1, 1975, Ser. No. 592,268
Claims priority, application Sweden, July 4, 1974, 7408811
Int. Cl.² B60R 19/04
U.S. Cl. 293—71 R 6 Claims



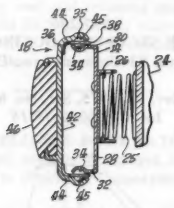
1. In an energy absorbing vehicular bumper having an elongated support beam the improvement comprising shock absorbing means having a support side facing the beam and an impact side facing away from the beam, the shock absorbing means being in the form of a mass of semi-elastic material shaped to form a plurality of adjacent parallel open-ended cells extending transversely of the beam, each of the cells having at least one common side wall with an adjacent cell, the mass of semi-elastic material also forming an internal wall located intermediate and coextensive with the support side and the impact side of the shock-absorbing means, said internal wall constituting a common bottom wall for all of the cells whereby cells on one side of the internal wall open only at said support side and whereby cells on the other side of the internal wall open only at said impact side.

3,997,208

ANGULAR IMPACT ABSORBING DEVICE

Tetsuo Nomiyama, 1526 N. Century, Santa Ana, Calif. 92703

Filed Dec. 1, 1975, Ser. No. 636,721
Int. Cl.² B60R 19/08
U.S. Cl. 293—71 R 6 Claims



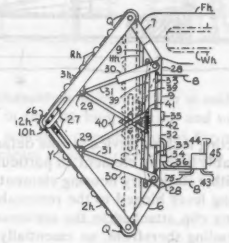
1. An angular impact-absorbing device comprising:
a first, elongated body member mounted in a fixed, substantially-stationary manner;
a second, elongated body member slidably mounted to said first, fixed body member for longitudinal movement relative thereto;
bearing means disposed between said first and second body members, and comprising:
a plurality of ball bearings positioned between said first and second body members and held in spaced relation to each other;
retaining means for positioning said ball bearings therebetween, said means secured to at least one of said body members; and
wherein said first body member is formed by an elongated channel having projecting longitudinal flanges, said flanges being provided with said raceways; and wherein said second body member is formed as an elongated channel having projecting flanges provided with said raceways, said flanges of said second body member being superposed over said flanges of said first body member, whereby said raceways thereof are in alignment with each other to receive said ball bearings therein.

3,997,209

COLLISION DEFLECTING SYSTEM FOR FAST MOVING VEHICLES

John J. Chika, 1350 Orchard Ridge Road, Bloomfield Hills, Mich. 48013

Filed Feb. 8, 1972, Ser. No. 224,415
Int. Cl.² B60R 19/04
U.S. Cl. 293—72 36 Claims



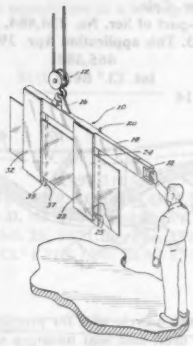
1. A collision deflecting system for fast moving vehicles comprising in combination:
an extendible and retractable assembly of rigid, elongated, bumper-like collision deflecting members pivotally, operatively an adjustably connected together and to the rigid forwardly structural members of said vehicle in such manner whereby in their plan-view configuration they are normally disposed substantially transversely to the longitudinal center-line of said vehicle when retracted, but when extending to their deflective position, the outboard ends of said members pivot about their pivotal means of attachment to said rigid members of said vehicle structure, and their inboard ends, adjustably, pivotally and operably connected together, swing angularily outwardly and forwardly to assume an angular configuration protruding substantially forwardly of said vehicle, and comprising at the apex of said forwardly protruding pivotal connection:
a directional deflection-triggering sensor means protruding substantially therefrom, and so configured that it compells any frontal impact against it into an oblique impact against either of the two adjacent outboard-facing sides of said angularily configured deflective assembly;
a roller-type impact-deflecting means strategically located at a plurality of points along the outward-facing contours of said angularily positionable deflective assembly, and especially at its outboard apexes, said roller means protruding substantially outwardly from the outward contour of said assembly to sustain and increase said triggered deflection along said outward contour of said assembly and past said outboard apexes, and further comrising:
a plurality of unique skid-plate means comprising panels of composite materials configured in such manner that while they may be applied seemingly permanently to the outermost surfaces of said bumper-like assembly which are subject to come into any violent contact with the colliding object, they will, under any severe oblique impact against them, slide and peel off from whatever surface they are applied to; thus not only further sustaining and increasing any deflection transferred onto them by said deflection triggering means and said roller-type deflectors, but also compelling into deflection any violent, oblique impact against them by any object at any point intermediate any two of said adjacent roller-type impact deflecting means.

3,997,210

LIFT CRADLE FOR SHEET MATERIAL

Richard Stanley Jay, Evanston, Ill., assignor to Jarke Corporation, Chicago, Ill.

Filed Mar. 15, 1976, Ser. No. 667,078
Int. Cl.² B66C 1/22
U.S. Cl. 294—81 R 13 Claims



1. A lift cradle for flat sheet material for use in conjunction with a storage rack for flat sheet materials of the type formed by at least a pair of base members having a plurality of stanchions mounted thereon in spaced relation along the length of the base members, comprising in combination,

a support beam having lift means associated therewith to accommodate interconnection to a lifting mechanism,

at least one pair of jaw members mounted on said support beam and extending downwardly therefrom to lower ends,

said pair of jaw members being positioned in substantially opposed relation one to the other and being spaced a distance apart,

one of said jaw members including cradle means adjacent said lower end thereof,

the opposed one of said jaw members including sheet separation means adjacent said lower end thereof,

and said jaw members being dimensionally sized for insertion within and between the confines of a storage rack having a pair of base members and a plurality of sheet support stanchions mounted thereon,

whereby sheet materials stored within the confines of the storage rack may be removed therefrom by lowering said jaw members within the confines of the storage rack such that said sheet separation means segregates an individual sheet material from the remaining sheets stored therein until said cradle means is positioned below the lower edge of the sheet material and said jaw members may then be uplifted thereby to trap and confine the sheet material within the confines of said cradle means to liftingly remove the sheet material from the storage rack and position the same elsewhere, and insertion of the sheet materials within the storage rack may be accomplished by the reverse process.

3,997,211

RETRACTABLE PATIO ASSEMBLY FOR USE ON A PICKUP TRUCK MOUNTED CAMPER OR THE LIKE

Cloise D. Graves, Rte. 2, Box 166, Ontario, Oreg. 97914

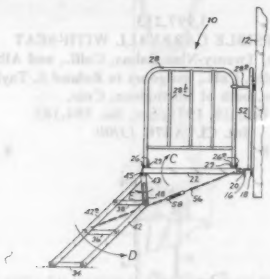
Filed Sept. 2, 1975, Ser. No. 609,535
Int. Cl.² B60P 3/32
U.S. Cl. 296—23 G 12 Claims

1. A stowable patio assembly for use adjacent to a door opening on a wall structure of a vehicle-mounted camper, trailer or the like comprising:

transversely extending mounting means adapted for attachment adjacent to the wall structure;

platform means laterally shiftable along and pivotally connected to said mounting means for selective horizontal and vertical positioning in front of and alongside the door opening; and

ascending and descending means pivotally connected to a margin of said platform means for engaging a ground surface and providing support for a horizontally disposed platform means;



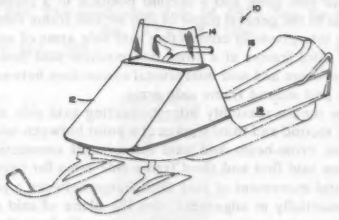
said platform means being laterally shiftable from a first substantially horizontal position to a second position alongside the door opening for pivotal movement about said mounting means and substantially vertical retractable placement adjacent the wall structure; said ascending and descending means being pivotal about said margin for retractable placement against said platform means to thereby provide a stowed inoperable patio assembly adjacent the wall structure and the unobstructed door opening.

3,997,212

SNOWMOBILE WINDSHIELD ASSEMBLY

Roger Howard Tesch, Beaver Dam, Wis., assignor to Deere & Company, Moline, Ill.

Filed July 3, 1975, Ser. No. 592,870
Int. Cl.² B60J 1/02
U.S. Cl. 296—84 A 3 Claims



1. A vehicle windshield assembly comprising: a windshield support having upper and lower surfaces of which the upper surface defines an elongate recess; said support having a plurality of spaced slots extending therethrough in said recess; a resilient gasket received in said recess and having openings extending therethrough in alignment with respective ones of said slots; a windshield having a lower edge defining a plurality of tabs respectively inserted in respective aligned openings and slots and interconnected by lower edge portions which are in engagement with said gasket; and a plurality fastener means respectively secured to the plurality of tabs, said plurality of

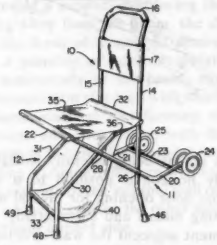
fastener means each including a U-shaped spring metal clip having opposite legs disposed one on each side of a respective one of the tabs; said legs having respective end portions which bear on the lower surface of the support at respective first locations spaced from said one of the tabs when the clip is in a free condition; and screw means extending through the legs of each clip and the tab located therebetween and holdng the said respective end portions of the legs of each clip in respective second locations closer to the tab than said first positions when the screw means is tightened to thereby resiliently load the clip between the lower surface of the support and the tab.

3,997,213

COLLAPSIBLE CARRYALL WITH SEAT

William Q. Smith, Twenty-Nine Palms, Calif., and Albert W. Gebhard, Boulder, Colo., assignors to Roland S. Taylor and Gayle Y. Taylor, both of Northglenn, Colo.

Filed Feb. 28, 1975, Ser. No. 554,185
Int. Cl.² A47C *13/00*
U.S. Cl. 297—118 8 Claims



1. Apparatus having two selectable positions which in one position is usable as a seat and in the other position assumes a substantially flat or planar configuration for storage or use as a load-carrying device comprising:

first, second and third frames each including a pair of elongated side arms interconnected at one end by a cross-beam in a generally U-shaped configuration,

means attached at the extremities of said first frame side arms for movably engaging a surface,

means interpivotally connecting said first frame side arms and said second frame side arms for permitting pivoting of said surface engaging means between a first position in the general plane of but beyond the ends of said second frame side arms and a second position in a plane at an angle to the general plane of said second frame side arms,

means interpivotally connecting said side arms of said first and third frames at a point intermediate said first frame cross-beam and said interpivotal connection between said first and second frame side arms,

linkage means rotatably interconnecting said side arms of said second and third frames at a point between said third frame cross-beam and said interpivotal connection between said first and third frame side arms for permitting pivotal movement of said third frame between a position substantially in alignment with the plane of said second frame and a position extending outwardly from the plane of said second frame,

a foldable panel attached at opposite edges between said cross-beams of said first and third frames for providing a seat in a plane generally perpendicular to the plane of said second frame when said frames are interpivoted to a first extremity, and

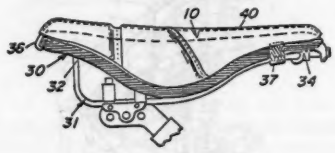
container means having opposite edges thereof attached at spaced points between said third frame side arms, whereby interpivoting of said frames to one extremity positions said panel in a seating arrangement with the ends of said second and third frames providing surface support whereas interpivoting of said frames to the other extremity effects collapsing of said frames into a generally common plane with said movable means positioned for engaging the surface so that said container means can be used as a mobile loadcarrying device.

3,997,214

BICYCLE SEAT

David L. Jacobs, Boulder, Colo., assignor to The Jacobs Corporation, Boulder, Colo.

Continuation-in-part of Ser. No. 224,884, Feb. 9, 1972, Pat. No. 3,807,793. This application Apr. 29, 1974, Ser. No. 465,385
Int. Cl.² B62J *1/18*
U.S. Cl. 297—214 1 Claim



1. An elongated bicycle seat for providing proper accommodation for a user, said seat having a narrow leading end portion, a wider trailing end portion, and a plurality of depressions to include a first depression on said narrow leading end portion located on the central longitudinal axis of said seat, second and third depressions on said trailing portion and on opposite sides of said axis,

an elongated pad unit having the general shape of said seat,

means dividing said pad unit into a first compartment extending along the longitudinal axis of said pad unit and second and third compartments disposed on either side of said longitudinal axis,

a padding in each of said compartments, the padding in said second and third compartments being of a high viscosity substance having a yield point of at least 4 grams per square centimeter and a viscosity between about 100,000 and about 40,000 poises at 0° F and 80° F, and

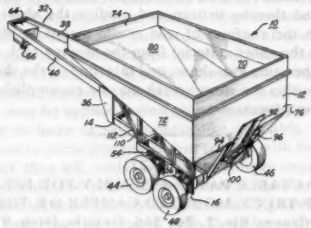
said padding in said first compartment being of a foam rubber material having a substantially lower viscosity than the substance in said second and third compartments.

3,997,215

GRAVITY BED TRAILER

Shirley L. Parker, Warsaw, and John D. Rohrer, North Manchester, both of Ind., assignors to Parker Industries, Inc., Silver Lake, Ind.

Filed Mar. 13, 1975, Ser. No. 557,944
Int. Cl.² B60P *1/36*
U.S. Cl. 298—24 6 Claims



1. A gravity bed trailer comprising a main frame having an upright frame member disposed on the forward end thereof,

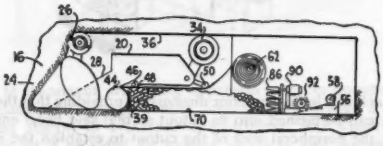
an undercarriage supporting said frame, a bed fixedly mounted on said frame and connected near its forward end to said upright frame member, said bed having two side walls and a rear wall joined to said side walls at their vertical edges and a bottom joined to the lower edges of said walls and being inclined downwardly from the front to the lower edge of said rear wall, said rear wall having an opening in the lower portion thereof, a door for closing said opening, and a tongue extending forwardly from a point near the upper end of said upright frame member for connection to a towing vehicle.

3,997,216

APPARATUS FOR CONTINUOUS MINING

John D. Russell, R.D. No. 1, Portersville, Pa. 16051

Filed Oct. 21, 1971, Ser. No. 191,387
Int. Cl.² E21C *1/00*; B65G *65/06*
U.S. Cl. 299—57 **11 Claims**



1. Apparatus for continuously conveying dislodged material to a fixed discharge station comprising,

an advanceable conveyor loading frame,

a first spindle mounted adjacent to said fixed discharge station,

a second spindle mounted adjacent to said fixed discharge station above said first spindle,

drive means to selectively rotate at least one of said spindles in a preselected direction,

a flexible belt having an end portion connected to said first spindle so that upon rotation of said first spindle in a preselected direction said flexible belt is coiled on said first spindle,

said flexible belt having a second end portion coiled on said second spindle so that upon rotation of said first spindle in a preselected direction said flexible belt is uncoiled from said second spindle,

a turnaround device mounted on said frame and movable therewith,

said flexible belt having an intermediate portion reeved about said turnaround device to form a lower strand and an upper strand,

powered conveying means laterally disposed along the sides of said frame adjacent said turnaround device to convey dislodged material transversely onto the upper surface of said lower strand, said material on said lower strand supporting said upper strand and

said drive means operable to rotate said first spindle and move said lower strand intermediate portion toward said discharge station and convey said material positioned thereon toward said discharge station.

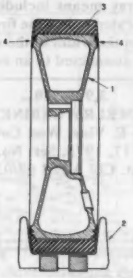
2. The apparatus of claim 1 including a mining machine to continuously dislodge material for conveying from a mine face and characterized by a pair of counter- rotating conical cutters to dislodge material from the mine face and discharge said dislodged material laterally toward the mine ribs, the adjacent opposed surfaces of said cutters in tangentially parallel vertical planes with their bottom surfaces in a tangential plane parallel with the plane of the mine floor.

3,997,217

MACHINE OR VEHICLE COMPONENT AND REINFORCEMENT ELEMENT

Pierre Bandet, Neuilly; Roger Boulassier, Noisy-le-Sec, and Jacques Dufour, Paris, all of France, assignors to Le Magnesium Industriel, Paris, France

Filed June 5, 1974, Ser. No. 476,386
Int. Cl.² B62D *55/14*
U.S. Cl. 301—5 R **3 Claims**



1. A roller for turning in a track wherein the side walls of the roller are subjected to impact and wear, in which the roller comprises a cylindrical core, a solid rubber tire about the periphery of the cylindrical core, and having an integral portion which extends over the adjacent side wall portion of the core, an annular groove extending inwardly from the surface of the side wall of the core adjacent the outer peripheral portion, and a ring formed of a metal characterized by high resistance to impact and abrasion having a portion interfitting with the groove in the core and overlying the grooved side walls of the core with an outer portion disposed between the core and a portion of the solid rubber tire overlying the side walls of the core.

3,997,218

CABINET STRUCTURE FOR DENTAL TREATMENT ROOM

Hugo M. Wolf, 1451 NE. Glacier Lane, Minneapolis, Minn. 55421, and Leo H. Wolf, 2000 Idaho Ave. South, Minneapolis, Minn. 55426

Division of Ser. No. 558,322, March 14, 1975, which is a division of Ser. No. 292,478, April 3, 1972, Pat. No. 3,902,246. This application July 24, 1975, Ser. No. 598,557
Int. Cl.² A47B *81/00*
U.S. Cl. 312—209 **9 Claims**

1. A mobile cabinet for use in a dental treatment room comprising: a pair of laterally spaced upright side panels, said panels being flat members located generally parallel to each other and having upright front edges and upright rear edges, base means for carrying said side panels, wheel means secured to the base means to movably support the cabinet on a supporting surface, a plurality of pull-out drawers movably

mounted on the side panels adjacent the top of the base means, horizontal tray means for supporting objects, and means movably mounting said tray means on the side panels above said drawers for selective movement to a front out position or a rear out position, said tray means being in the front out position when a part of the tray means is located outwardly of the upright front edges of the side panels and said tray means being in the rear out position when a part of the tray means is located outwardly of the upright rear edges of the side panels said tray means including second and third trays, said third tray located below the first tray, said third tray having a width less than the width of the remaining tray means and an upright divider connected to an edge of said third tray.

3,997,219

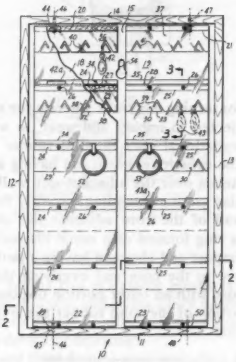
JEWELRY CABINET

Gary M. Phelps, 1211 E. Vine, West Covina, Calif. 91791

Filed July 17, 1975, Ser. No. 596,654

Int. Cl.² A47B *67/02*

U.S. Cl. 312—234 **4 Claims**



1. Means for storing jewelry comprising:

a cabinet having a base, a roof and vertical side walls, providing an opening at the front;

vertical door means at the front pivoted to swing in vertical planes so that the door means may be pivoted to a position where it is a vertical closure for the front opening and to another position where it opens to provide access to the interior of the cabinet;

shelf means attached at the rear of the door means, said shelf means having a rear edge;

strip means depending from the rear edge of the shelf means to a position below the shelf means;

said strip means containing slot means below the shelf means from which jewelry items may hang, said slot means being in the shape of an inverted V one side of which extends to the bottom of the strip means for insertion of a jewelry item and the other side of which terminates short of the bottom of the strip means to hold the jewelry item against falling from the slot means.

3,997,220

DISPLAY UNITS

Raymond E. Mayer, 88 Salem Road, Schwenksville, Pa. 19473

Filed June 23, 1975, Ser. No. 589,621

Int. Cl.² A47B *81/00*

U.S. Cl. 312—242 **6 Claims**

6. A composite merchandise display device and simulated building wall unit comprising:

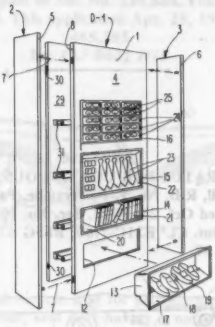
a flat, elongated, generally rectangular main panel for standing upright on a floor, the panel having a front and a rear face at least one face including a decorative surfacing;

a pair of side supports disposed respectively along the opposite lengthwise edges of the main panel and standing upright on the floor, each support comprising a flat panel extending normally to the main panel and extending away from the front and away from the rear of the main panel to provide vertical support for the main panel;

means releasably connecting each side panel to the main panel;

a plurality of cutout sections in the main panel;

a plurality of display trays respectively disposed in said cutouts, each tray having a bezel extending around its edge;



each tray having exterior dimensions providing that the tray can be pushed into its cutout so that said bezel engages the peripheral area of the cutout to establish the innermost position of the tray and in said position the exterior dimensions providing for the tray to be firmly engaged with its cutout, the engagement securing the tray in position but providing for the tray to be pulled and/or pushed out in the reverse direction; and

means in each tray for supporting an article of merchandise for display.

3,997,221

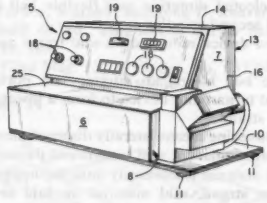
ELECTRONIC EQUIPMENT CABINET

James G. Bruni, Manhattan Beach, Calif., assignor to Baxter Laboratories, Inc., Deerfield, Ill.

Filed Mar. 18, 1976, Ser. No. 668,019

Int. Cl.² A47B *88/00*

U.S. Cl. 312—294 **4 Claims**



1. In a scientific apparatus comprising a lower compartment containing apparatus components and having mounted thereon an upper compartment containing additional apparatus components, said upper compartment having a cover including a front panel on which various control elements are mounted, the improvement comprising, a common back member for said lower comparment and upper compartment, the lower portion of said back member forming the back cover of said lower compartment, the upper portion of said back member forming the back cover of said upper compartment, said cover being hinged on the upper end of said back member and upwardly and rearwardly swingable on the upper end of said back member whereby the interior of said upper compartment

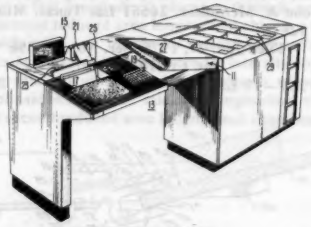
is exposed, and said back member being hinged adjacent its bottom end on said lower compartment and rearwardly tiltable to expose the interiors of said lower and upper compartments.

3,997,222

LID CONTROL APPARATUS FOR DOCUMENT PROCESSING EQUIPMENT

Anthony Horak, Detroit, Mich., assignor to Burroughs Corporation, Detroit, Mich.

Filed Apr. 28, 1975, Ser. No. 572,216
Int. Cl.² A47B *63/00*
U.S. Cl. 312—319 **22 Claims**



1. In document processing apparatus wherein documents are transported from a hopper compartment through a processing station to a stacker compartment, and wherein a hinged lid is provided for gaining access to said processing station for the performance of manual functions, improved lid control mechanism responsive to minimal opening and closing force and effective for positionably holding said lid when moved to a partially or fully opened position and for permitting the gravitational closing of said lid when closably moved to a predetermined point short of is fully closed position, said mechanism comprising:

a. a pair of pivotally interconnected arms pivotally connected to said lid and to the frame structure of said document processing apparatus, the pivotal interconnection of said pair of arms being accommodated by a threaded bolt received within central apertures formed in the vertex ends of said arms and a nut secureably engaged with the threaded shaft of said bolt, the secureable engagement being effected by means of an elastic internally threaded sleeve coaxially disposed of the internal threads of said nut and housed within the outer configuration of said nut, said elastic sleeve having an inner diameter slightly less than the inner diameter presented by said internal threads of said nut,

b. vertex friction applying means associated with said pivotal interconnection of said pair of arms and effective for positionably holding said lid when moved with minimal opening force to a partially or fully opened position, said vertex friction applying means defined to include,

i. a plurality of embossed projections extending from a side surface of a first of said arms in symmetrical arrangement relative to said central aperture formed in said vertex end thereof, and

ii. yieldable spring means positioned by said bolt and disposed intermediate said nut and a side surface of one of said arms, said spring means being effective for applying a selectable frictional force between said embossed projections of said first arm and an adjacent side surface of a second of said arms when said lid is openably moved a predetermined distance away from its fully closed position, and

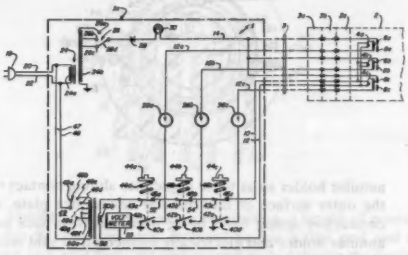
c. vertex friction relieving means associated with said friction applying means and effective for permitting the gravitational closing of said lid when closably moved to a predetermined point short of its fully closed position.

3,997,223

APPARATUS AND METHOD FOR REJUVENATING CATHODE RAY TUBES

Harold Feldman, Skokie, Ill., assignor to Dynascan Corporation, Chicago, Ill.

Filed Apr. 30, 1975, Ser. No. 573,369
Int. Cl.² H01J *9/50*
U.S. Cl. 316—2 **9 Claims**



1. In a circuit for rejuvenating the cathode of a cathode ray tube and including heater filament, cathode and control grid connecting terminals to be connected respectively to the heater filament, cathode and control grid of a cathode ray tube electron gun, a source of positive voltage for said control grid which voltage source when connected between said control grid and cathode heated to a temperature resulting from the flow of a given amount of current through the associated heater filament results in current flow between the cathode and control grid which can effect rejuvenation of the cathode, and a source of heater voltage which when coupled with said heater filament will result in the flow of said given amount of filament current, the improvement comprising first switch means having a first condition for connecting said source of heater voltage to the heater filament connecting terminals and a second condition for disconnecting said source of heater voltage therefrom, second switch means having a first condition for disconnecting said source of positive voltage from said cathode or control grid connecting terminal and a second condition for connecting said source of positive voltage thereto so the source of positive voltage is connected between said cathode and control grid to cause an electron attracting field at said control grid, said first and second switch means being maintainable in only said first or second conditions at the same time so a sustained flow of heater current and a sustained connection of said source of positive voltage between the said cathode and control grid cannot occur simultaneously, and switch operating means for selectively operating said first and second switch means simultaneously in said first or second conditions.

3,997,224

ELECTRICAL CONTACTING DEVICE

Naoki Ogawa, Yokohama, and Kazuo Ikawa, Tokyo, both of Japan, assignors to Nissan Motor Co., Ltd., Japan

Filed Dec. 16, 1975, Ser. No. 641,269
Claims priority, application Japan, Dec. 23, 1974, 49-4463U
Int. Cl.² H01R *39/00*
U.S. Cl. 339—5 M **8 Claims**

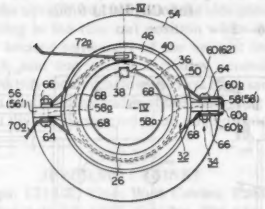
1. An electrical contacting device for providing continuous electrical connection between first and second electrical devices mounted on a rotatable shaft and a relatively stationary member, respectively, comprising:

at least one annular conductive plate coaxially securely and insulatedly mounted on said rotatable shaft, said annular conductive plate being electrically connected with said first electrical device;

an outer annular holder concentrically positioned around and radially spaced apart from said annular conductive plate for forming a generally toroidal gap between said

annular conductive plate and said outer annular holder, said outer annular holder being securely connected to said relatively stationary member; and

at least one conductive spring band supported on said outer annular holder so as to be urged into sliding contact with the outer surface of said annular conductive plate, said conductive spring band being insulated from said outer annular holder and electrically connected to said second electrical device.

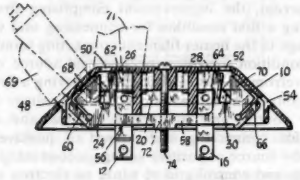


3,997,225

GROUNDING TYPE ADAPTOR RECEPTACLE

Elwood R. Horwinski, Cheshire, Conn., assignor to Product Concepts, Inc., Middlebury, Conn.

Filed July 3, 1975, Ser. No. 593,124
Int. Cl.² H01R 3/06
U.S. Cl. 339—14 R 2 Claims



1. An electrical receptacle type adaptor providing from a standard wall outlet having a ground portion, multiple circuits to accommodate up to four three-prong grounding-type electrical plugs, comprising in combination:

a. a wall plate adapted to overlie the wall outlet,

b. a pair of conductive prongs protruding from the rear of the wall plate and adapted to be received in the recesses of the wall outlet for establishing electrical contact with the circuits thereof,

c. means defining an electrical three-conductor socket in the wall plate, two of the said three conductors thereof being connected respectively to said prongs,

d. conductive means providing an electrical connection from the third of said conductors to the ground portion of said wall outlet, and

e. means defining three additional, three-conductor sockets in the wall plate adapted to receive three additional electrical plugs respectively, two of the said three conductors of each socket being connected respectively to said prongs,

f. said sockets being substantially aligned with one another,

g. said conductive means comprising a single, one-piece elongate solid conductor bar extending adjacent said aligned sockets, each end of said bar having a pair of integral transverse spring contact fingers disposed angularly with respect to each other and adapted to mechanically engage and electrically contact the ground pins respectively of the plugs inserted into said sockets,

h. said bar including non-yielding abutment portions interposed between the spring fingers of each pair, respectively,

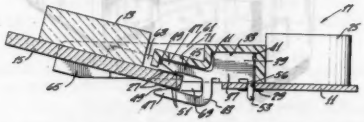
i. said abutment portions each cooperating with only one of the fingers of each pair for frictional engagement with the ground pin of a plug and providing a non-yielding, fixed positioner device and guide for said plug to maintain the alignment thereof.

3,997,226

MOUNTING AND CONTACT ASSEMBLY FOR INTERCONNECTION OF DISPLAY AND LOGIC CIRCUIT ELEMENTS IN DIGITAL ELECTRONIC CALCULATORS

Roger D. Lang, 5175 Thorntree, Irvine, Calif. 92664; Philip J. Thomas, 3952 Patrick Henry Place, Agoura, Calif. 91301, and John A. McAllister, 26661 Las Tunas, Mission Viejo, Calif. 92675

Filed Jan. 27, 1975, Ser. No. 544,396
Int. Cl.² H05K 1/07
U.S. Cl. 339—17 LM 15 Claims



1. An interconnecting assembly for mechanically and electrically connecting a display printed circuit board to a logic printed circuit board in a microelectronic display device, comprising:

a semi-resilient dielectric body;

a plurality of planar contact means mounted on said body;

each contact means having a first solder contact extending in a first direction from said contact means for insertion through an aperture in a respective solder contact on the face of a first one of said printed circuit boards;

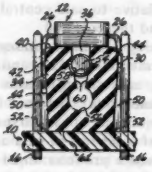
each contact means also having a second contact extending in a direction which is at a slight angle from perpendicular to said first direction for receiving one edge of the second of said printed circuit boards by disposing said second board at a slight angle to the plane of said first board and sliding said second board edgewise in its own plane toward said first board to engage the second contact of each contact means with a respective contact on the second board and to place an edge of said second board substantially at the plane of said first board.

3,997,227

CONNECTOR AND HANDLING DEVICE FOR MULTILEAD ELECTRONIC PACKAGES

John M. Cutchaw, 7333 E. Virginia, Scottsdale, Ariz. 85257

Filed July 28, 1975, Ser. No. 599,893
Int. Cl.² H01R 13/54
U.S. Cl. 339—17 CF 6 Claims



1. A device for supportingly carrying an integrated circuit, said integrated circuit having a plurality of leads arranged in a spaced pair of parallel rows, said device comprising:

a. an elongated laterally expandable body of resilient material and having an opposed pair of oppositely facing longitudinal side surfaces, said body positionable between the rows of leads of the integrated circuit with each of the longitudinal side surfaces of said body positioned in inwardly disposed juxtaposed relationship to a different one of the parallel rows of leads of the integrated circuit;

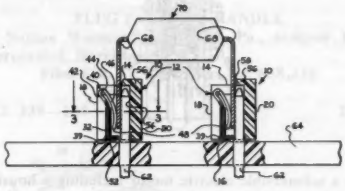
b. means in said body for laterally expanding said body to move the longitudinal side surfaces thereof into gripping engagement with their respective ones of the rows of leads of the integrated circuit when said body is positioned therebetween; and

c. said body having a longitudinal slot formed therein to provide said body with a pair of longitudinal segments each having one of the longitudinal side surfaces of said body thereon, the slot in said body being configured to provide a first longitudinal chamber through said body and a second reduced area longitudinal chamber through said body with said means for laterally expanding said body being movable therebetween for laterally oppositely moving said pair of longitudinal segments upon movement of said means from said first longitudinal chamber to said second reduced area longitudinal chamber of said body.

3,997,228
CONNECTOR FOR DIP

Glenn Harlan Gluntz, Harrisburg, Pa., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Aug. 22, 1975, Ser. No. 606,780
Int. Cl.² H01R *13/50*
U.S. Cl. 339—17 CF 4 Claims

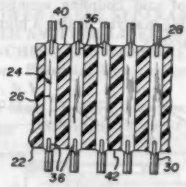


1. A connector for forming electrical connections between leads and pins extending from a circuit board or the like, said connector comprising an elongate insulating body having a member on one side of the body running the length of the body, a number of projections spaced along the member and extending from the member toward an opposite side of the body, the projections having opposed walls defining open sided recesses between adjacent projections extending across the body, each wall having a slot in each recess, and a metal wall closing each recess, each metal wall including edges seated in a pair of said slots, an integral spring extending into a recess and friction fit dimples on its inner surface, there being a dimple in each slot for frictionally securing the metal wall to the body, the outer surfaces of said metal walls being flat whereby, upon mounting of the connector on a series of circuit board pins so that the pins extend into the recesses from one side of the body, leads may be inserted into the recesses from the other side of the body between the pins and the springs to compress the springs and form electrical connections between the pins and leads with the flat surfaces of the metal walls held against projections within the slots.

3,997,229
FLEXIBLE CONNECTING MEANS

Ronald S. Narozny, Panorama City, and Dennis Bossi, La Crescento, both of Calif., assignors to Thomas & Betts Corporation, Elizabeth, N.J.

Filed Sept. 15, 1975, Ser. No. 613,410
Int. Cl.² H01R *31/08*
U.S. Cl. 339—19 14 Claims



1. Flexible connecting means comprising: a length of generally flat flexible dielectric material having a first end and a second end, said first and said second ends defining the limits of the length of said dielectric material; and a plurality of thin metallic strips of substantially uniform thickness disposed within said dielectric material and arranged in spaced parallel relationship, each of said strips having a first end, a second end, and a generally flat flexible central portion oriented coplanar with said dielectric material; said first and second ends of said strips each comprising an elongate curled tubular portion to provide a contact means thereat, each of said curled portions being located beyond a respective one of said first and second ends of said flexible dielectric material for connection to a further member, each of said strips further comprising elongate stiffening means in the form of an elongate coined portion deformed out of the plane of said strip and integral therewith, said coined portion being located between each of said curled portions and said central portion of each of said strips to provide a rigid zone thereat, said strips being selectively located in said flexible dielectric material such that said coined portions each extend partially within and partially beyond the limits of the length of said flexible dielectric material as defined by said first and second ends thereof to reduce the flexure of said strips at the juncture between each of said first and second ends thereof and a respective one of said first and second ends of said flexible dielectric material.

3,997,230
CONNECTOR FOR SMALL DIAMETER TOWED SONAR ARRAY

Stanley Secretan, Leona Valley, Calif., assignor to The Bendix Corporation, North Hollywood, Calif.

Filed May 2, 1975, Ser. No. 574,152
Int. Cl.² H01R *25/00*
U.S. Cl. 339—49 R 7 Claims

1. A coupling assembly for joining two sections of a small diameter towed sonar array wherein each section includes a sheath of flexible tubing material enclosing hydrophones and associated interconnected electronic equipment and an axially extending strength member in the form of a multistrand rope of synthetic fiber in an enclosed environment of positively buoyant dielectric fluid;

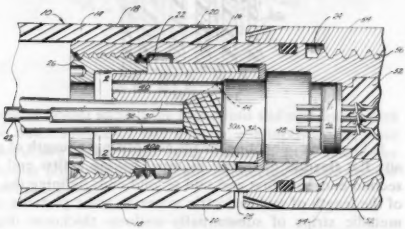
said assembly comprising, in each section to be joined, a cylindrical coupling member having a set of inboard internal threads, a set of outboard external threads and a plurality of internal shoulders,

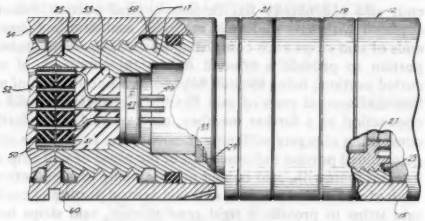
a collar having a tapered internal surface positioned internally of said coupling member,

a pair of mating semicylindrical clamp members having tapered surfaces adjoining the tapered internal surface of said collar, said clamp members as assembled including an axial bore therethrough receiving said rope, a plurality of passageways parallel to said bore and an outboard conical bore,

means threadedly engaged with said internal threads for forcing said collar axially outwardly and clamping said clamp members tightly around said rope, a header member of insulating material abutting against one of said internal shoulders and sealed to the inside surface of said coupling member and a plurality of electrically conducting pins extending through said header member,

a connector member internally of and positioned at the outboard end of said coupling member comprising a wafer of insulating material having a plurality of concentric conductor tracks;





conductor means connecting said tracks with said conducting pins,

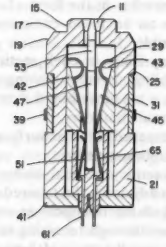
and an internally threaded collar having left-hand threads near one end and right-hand threads near the other end threadedly engaged with the external threads of said coupling members of sections to be joined such that as said collar is turned in one direction said coupling members are pulled together forcing said concentric conductor tracks together.

3,997,231

TEST CONNECTOR

Theodore R. Sherwood, Sunnyvale, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Dec. 8, 1975, Ser. No. 638,885
Int. Cl.² H01R *13/54*
U.S. Cl. 339—75 M **7 Claims**



1. An electrical connector which comprises:

a. an upper portion for receiving at least one contact from a first electrical device;

b. a lower portion for receiving at least one contact from a second electrical device;

c. a contact board located between said upper and lower portions, said board having at least one electrical contact thereon, said at least one electrical contact comprising a strip portion joined to a spring portion, said strip portion consisting of electrically conductive material located on the face of the board and said spring portion, in contact with said strip portion, consisting of resilient electrically conducting material attached to said board at one end and projecting therefrom at the other end;

d. a camming apparatus located in said upper portion;

e. said camming apparatus comprises a matched pair of blocks surrounding said contact board;

f. each block having a top portion and a bottom portion and each having at least one cavity in its inward-facing side;

g. said at least one cavity is larger at said top portion than at said bottom portion; whereby

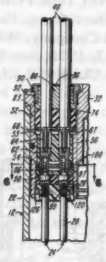
h. an electrical connection may be made between said first and second devices said connection being completed and undone according to the positioning of said contact board within said camming apparatus.

3,997,232

SUBMERSIBLE ELECTRIC MOTOR AND ELECTRICAL CONNECTOR ASSEMBLY

Louis R. Dunaway, Gettysburg, Ohio, assignor to Century Electric Motor Co., Gettysburg, Ohio

Filed May 19, 1975, Ser. No. 578,532
Int. Cl.² H01R *13/52*
U.S. Cl. 339—94 R **14 Claims**



1. In a submersible electric motor including a housing enclosing a stator and a rotor having a shaft supported by bearing means, an improved electrical connector assembly for coupling to said motor a plurality of individual power supply lead wires each having an exposed end portion projecting from a corresponding surrounding insulation, said connector assembly comprising means defining a bore within said housing, a corresponding plurality of electrically conducting socket members each having means defining an opening for slidably receiving the exposed end portion of the corresponding power supply lead wire, insulator means within said bore for supporting said socket members in generally parallel spaced relation, a resilient gland member disposed within said bore and having means defining a corresponding plurality of openings aligned axially with the corresponding said openings within said socket members, each said opening within said gland member being sized for slidably receiving said insulation on the corresponding said power supply lead wire, means on said housing for compressing said gland member in an axial direction after said exposed end portions of said power supply lead wires are inserted into the corresponding said openings within said socket members to produce a fluid-tight seal between said insulation of each said power supply lead wire and said motor housing, each of said socket members including a

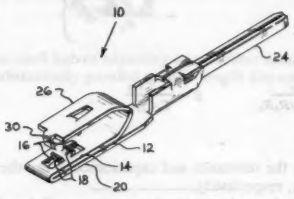
split upper end portion, a strain relief member positioned adjacent said socket members and having holes for receiving corresponding said end portions of said socket members, means for camming said upper end portions of said socket members into firm gripping relation with said end portions of said power supply lead wires in response to axial pressure exerted on said strain relief washer when said gland member is compressed, and means for electrically connecting each socket member to a corresponding lead wire within said housing.

3,997,233

FLAT CONDUCTOR CABLE CONNECTOR

Robert Franklin Evans, New Cumberland, Pa., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Feb. 19, 1976, Ser. No. 659,247
Int. Cl.² H01R 11/20
U.S. Cl. 339—97 C **7 Claims**



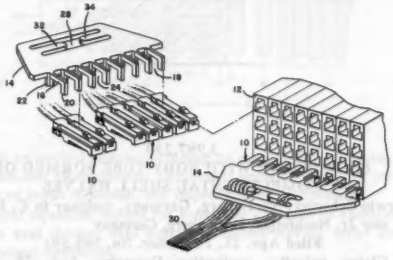
1. In a connector for a flat conductor cable comprising a base having a pair of spaced apertures therein, and an arm hingedly connected to the base including a pair of lances extending from the arm in alignment with the apertures in the base, the improvement comprising a pair of upwardly projecting inclined lances extending from said base, said lances in said base being spaced inwardly of said apertures in said base.

3,997,234

PLUG PACKAGE HANDLE

Jared Nathan Worman, Camp Hill, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Filed Feb. 17, 1976, Ser. No. 658,216
Int. Cl.² H01R 13/62
U.S. Cl. 339—105 **2 Claims**



1. A handle for supporting at least two groups of plugs in fixed spaced relation for unitary operation in insertion into and extraction from high density arrays of receptacles, each said group of plugs having a plurality of plugs secured to a web in fixed parallel spaced relation, said handle comprising:

a substantially planar body member of rigid insulator material with a plurality of parallel first fingers extending in the plane of said body member along one edge portion thereof and defining therebetween a plurality of plug receiving cavities,

means to secure groups of plugs in said cavities, and

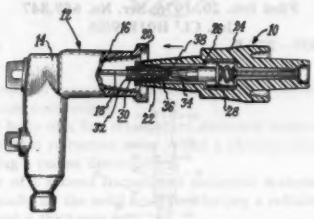
an H-shaped slot in said body member spaced from said one edge portion to define a pair of opposed cross bars extending parallel to said edge portion whereby strain relief is provided for conductors connected to said plugs by threading the conductors through said slots and about at least one of said cross bars.

3,997,235

SHIELDED POWER CABLE SEPARABLE CONNECTOR MODULE WITH SNUFFER LINER HAVING REDUCED ARC-QUENCHING GAS GENERATING PORTION

Vincent J. Boliver, Pittsfield, Mass., assignor to General Electric Company, N.Y.

Filed Mar. 27, 1975, Ser. No. 562,566
Int. Cl.² H01R 13/52
U.S. Cl. 339—111 **4 Claims**



1. Apparatus for connecting electrical power cable, the apparatus being of the type having a bore contact assembly for receiving a rod contact and rod contact follower, the bore contact assembly including a snuffer tube with a set of female contact members located at one end and a liner of ablative material on the inside wall of the tube, wherein the improvement comprises:

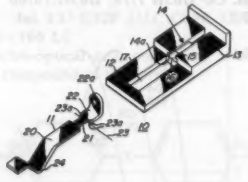
said ablative liner comprises an annular portion along the axis of the sleeve adjacent the contacts, which generates arc-quenching gas at a lesser rate on separation of said contacts than do other, remaining portion of said liner, said annular portion having a greater effective inside diameter than does the major remaining portion of said liner.

3,997,236

SELF-LOCKING ELECTRICAL CONTACT ASSEMBLY

Mark Steven Bresin, Tamarac, Fla., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Mar. 3, 1975, Ser. No. 554,858
Int. Cl.² H01R 9/16
U.S. Cl. 339—221 R **7 Claims**



1. An improved electrical contact assembly with hand-insertable, hand-removable self-locking electrical contact arms, comprising in combination:

at least one contact arm having a first end section, a reduced middle section, and a second end section, said contact arm being constructed of a resilient metallic material; and

a casing for receiving and mounting said contact arm in a

fixed position, said casing including an inverted generally T-shaped open ended slot along one surface thereof, said slot comprising a narrow outer channel running along and opening onto said surface and a wider inner channel opening into said outer channel;

a portion of said first end section of said contact arm making a sliding fit and positioned within said wider inner channel and a portion of said reduced middle section making a sliding fit and positioned within said outer narrower channel, said second end section of said contact arm pressing downwardly toward said casing to maintain said contact arm in said fixed assembled position.

3,997,237

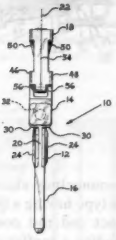
SOLDER TERMINAL

Donald Richard White, York, Pa., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Feb. 20, 1976, Ser. No. 659,847

Int. Cl.² H01R 9/06

U.S. Cl. 339—275 B **4 Claims**



1. In a terminal adapted for insertion in a plated hole in a circuit board including a mounting portion and a seating portion joining the mounting portion, the improvement comprising said seating portion including a hole extending therethrough transverse to a longitudinal axis of said mounting portion, and a cold formed solder element extending through the hole having expanded ends providing a solder mass at each opening of said hole on opposite sides of said seating portion.

3,997,238

HOLOGRAPHIC RECORDING PROCESS USING A THERMOPLASTIC PHOTOSENSITIVE MEMBER

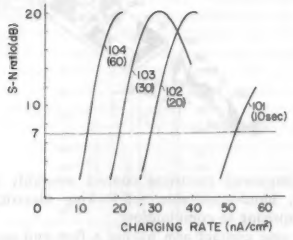
Akiyoshi Oride, Tokyo, and Michiharu Abe, Kawasaki, both of Japan, assignors to Ricoh Co., Ltd., Japan

Filed Sept. 30, 1975, Ser. No. 618,132

Claims priority, application Japan, Sept. 30, 1974, 49-113217

Int. Cl.² G03H 1/18; G03G 16/00

U.S. Cl. 350—3.5 **4 Claims**



1. A holographic recording process comprising the steps of:

1. providing a thermoplastic photosensitive member comprising a lamination of a thermoplastic layer, a photoconductive layer and a conductive layer disposed in the sequence named on a base member,
2. grounding said conductive layer,
3. charging on the surface of said thermoplastic layer with a charging rate and exposing the same to light having an intensity and holographic information, simultaneously during a time interval to thereby provide a current to flow through said lamination which current is defined by the following equation:

$$i(t) = \frac{E}{R_1 + R_2}\left\{1 - (C_1R_1 + 1)(C_2R_3 + 1)\,e^{\alpha t} + \frac{R_1 + R_2}{R_3}\,e^{\beta t}\right\} \quad (1)$$

and

$$\alpha = \frac{R_1 + R_2}{(C_1 + C_2)R_1R_2} \qquad \beta = \frac{C_1 + C_2}{C_1C_2R_3} \quad (2)$$

wherein

R_1 and C_1: the resistance and capacitance of the thermoplastic layer, respectively,

R_2 and C_2: the resistance and capacitance of the photoconductive layer, respectively,

R_3: a groundng resistance,

E: a voltage across the lamination, caused by the charging, and

t: the time elapsing after the initiation of the charging-exposing step;

i. said charging rate being chosen from those which lie in a region of characteristic curves above the line corresponding to 7 dB S/N ratio, and

ii. said characteristic curves representing the relationship between the S/N ratio of the reproduced holographic image and the charging rate with parameters of the light intensity and the charging-exposing time interval,

4. subsequently heating the thermoplastic layer to a temperature close to its softening point, and
5. cooling the softened thermoplastic layer to be solidified immediately after said heating step.

3,997,239

MICROSCOPE WITH BODY TUBE FORMED OF COMPLEMENTAL SHELL HALVES

Erwin Scherzer, Nuremberg, Germany, assignor to C. Proebster Jr. Nachfolger, Nuremberg, Germany

Filed Apr. 21, 1975, Ser. No. 569,591

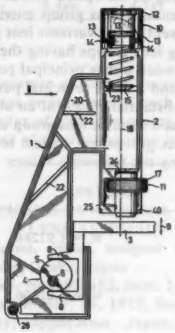
Claims priority, application Germany, Apr. 25, 1974, 2419966

Int. Cl.² G02B 21/24

U.S. Cl. 350—84 **14 Claims**

1. In a microscope having an arm; a body tube secured to the arm and having a length dimension; a stage supported by the arm; a mechanism for effecting relative movement between the body tube and the stage along the optical axis of the microscope; an ocular mounted in the body tube; an objective turret carrying a plurality of objectives and supported by the body tube eccentrically with respect to the optical axis; and a mechanism for rotating the objective turret for aligning a

selected one of the objectives with the optical axis; the improvement wherein the body tube is constituted by two com-



plemental shell halves adjoining one another along a direction that is substantially parallel to said length dimension.

3,997,240

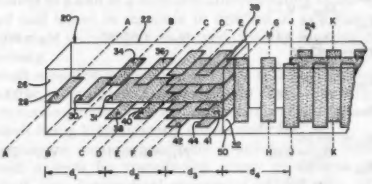
OPTICAL SYSTEM USING LIGHT EQUALIZER WITH PARTIALLY REFLECTIVE PLANE SURFACES

Paul L. Kebabian, Somerville, Mass., assignor to Environmental Research & Technology, Inc., Concord, Mass.

Continuation-in-part of Ser. No. 458,293, April 5, 1974, abandoned. This application Nov. 5, 1975, Ser. No. 629,089

Int. Cl.² G02B 5/14

U.S. Cl. 350—96 R 14 Claims



1. In an optical system including an optical device having a transmission characteristic dependent upon the angle of incidence of input radiation, the improvement comprising

optical equalizer means for providing a source of radiation to said device, said equalizer means having input and output apertures;

focusing means having a focal length and being disposed said focal length from away from said output aperture for collimating the radiation emitted from said output aperture and directing the collimated radiation through said optical device;

said equalizer means including means for distributing radiation entering said input aperture so that the relative emission intensities from the area elements of said output aperture, collected by said focusing means to be passed through said optical device, must be substantially the same regardless of the distribution of radiation entering said input aperture.

3,997,241

OPTICAL WAVEGUIDE TRANSMITTING LIGHT WAVE ENERGY IN SINGLE MODE

Shigeo Nishida; Shojiro Kawakami, both of Sendai; Yoichi Ohtaka, Mitaka, and Seiichi Onoda, Tokorozawa, all of Japan, assignors to Hitachi, Ltd., Japan

Continuation-in-part of Ser. No. 476,310, June 4, 1974, abandoned. This application Oct. 3, 1975, Ser. No. 619,518

Claims priority, application Japan, June 7, 1973, 48-64533

Int. Cl.² G02B 5/14

U.S. Cl. 350—96 WG 3 Claims

1. An optical waveguide transmitting light wave energy in a single mode comprising:

a solid body of a first transparent dielectric material having a uniform refractive index n and a circular cross-section having a radius dimension a;

a layer of a second transparent dielectric material formed coaxially on the solid body and having a refractive index qn and a thickness δa;

a layer of a third transparent dielectric material surrounding said layer of the second transparent dielectric material and having a refractive index pn; and

said three transparent dielectric materials having a following relationship:

$$\frac{2.4083}{\sqrt{\frac{1-p^2}{1-q^2}}} - 1 < \frac{2\alpha\pi n}{\lambda}\sqrt{1-q^2} < \frac{3.8327}{\sqrt{\frac{1-p^2}{1-q^2}}} - 1,$$

where μ is an optical wavelength.

3,997,242

ELECTRO-OPTICAL CELL CONTAINING DIELECTRIC ISONITRILES

Arthur Boller, Binningen, and Hanspeter Scherrer, Therwil, both of Switzerland, assignors to Hoffmann-La Roche Inc., Nutley, N.J.

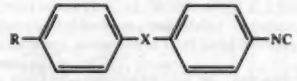
Division of Ser. No. 444,923, Feb. 22, 1974, Pat. No. 3,925,444. This application Aug. 18, 1975, Ser. No. 605,696

Claims priority, application Switzerland, Mar. 2, 1973, 3099/73

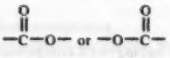
Int. Cl.² G02F 1/13; C09K 3/34

U.S. Cl. 350—160 LC 2 Claims

1. An electro-optical cell, comprising a dielectric which comprises a compound of the formula



wherein X is



and R is straght-chain alkyl of 1–7 carbon atoms, straight-

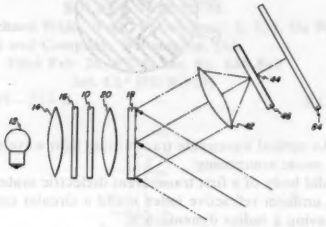
chain alkoxy of 1–7 carbon atoms, straight-chain alkanoyloxy of 1–7 carbon atoms or p-alkyloxycarbonyloxy wherein the alkoxy group is straight-chain alkoxy of 1–7 carbon atoms, or mixtures thereof, disposed between two plate means and means for applying an electric potential to said plates.

3,997,243

COLOR IMAGE REPRODUCTION SYSTEM

Richard F. Bergen, Ontario, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Feb. 20, 1975, Ser. No. 551,438
Int. Cl.² G03G *15/00;* **G02F** *1/23;* **G02B** *5/23*
U.S. Cl. 350—161 S **17 Claims**



1. A color image reproduction method comprising:

a. providing a multicolor original image;

b. providing an imaging member devoid of a color grating capable of recording images in the form of surface deformation phase gratings;

c. exposing said imaging member to a first imagewise pattern of illumination comprising illumination of a first primary color modulated by said original image, wherein said first pattern of illumination is spatially modulated at a first angular orientation; and

d. in registration with said first exposure, exposing said imaging member to a second imagewise pattern of illumination comprising illumination of a second primary color modulated by said original image, wherein said second pattern of illumination is spatially modulated at a second angular orientation,

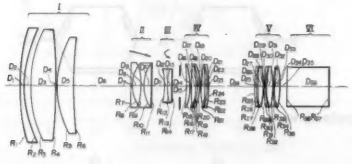
whereby there are formed in superimposition on the imaging member a plurality of images in the form of surface deformation phase gratings.

3,997,244

ZOOM LENS HAVING WELL-COMPENSATED DISTORTION

Eiichi Takano, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 20, 1973, Ser. No. 426,498
Claims priority, application Japan, Dec. 27, 1972, 48-130037
Int. Cl.² G02B *15/18*
U.S. Cl. 350—184 **1 Claim**



1. A zoom lens having well-compensated distortion comprising:

a convergent focusing group, a divergent variator lens group, a compensator lens group and a relay lens group disposed in that order along an optical axis, said variator lens group moving on the optical axis at the time of zooming, said compensator lens group moving in association with the movement of the variator lens group, said variator and focusing lens groups having the relationship that the interval between a rear principal point of said focusing lens group and a front principal part of said variator lens group is substantially 83% of an absolute value of a focal length of said variator lens group when said focusing and variator lens groups are closest to each other, said zoom lens having the following values:

$R_1 = 73.78$			
$D_1 = 1.60$	$N_1 = 1.92286$	$V_1 = 21.3$	
$R_2 = 43.90$			
$D_2 = 2.40$			
$R_3 = 46.98$			
$D_3 = 9.40$	$N_2 = 1.61800$	$V_2 = 63.4$	
$R_4 = -284.27$			
$D_4 = 0.15$			
$R_5 = 35.46$			
$D_5 = 7.00$	$N_3 = 1.61800$	$V_3 = 63.4$	
$R_6 = 153.35$			
$D_6 =$ variable*			
$R_7 = 360.30$			
$D_7 = 0.65$	$N_4 = 1.88300$	$V_4 = 41.0$	
$R_8 = 13.20$			
$D_8 = 3.57$			
$R_9 = -24.56$			
$D_9 = 0.70$	$N_5 = 1.78650$	$V_5 = 50.2$	
$R_{10} = 14.64$			
$D_{10} = 2.65$	$N_6 = 1.92286$	$V_6 = 21.3$	
$R_{11} = 304.23$			
$D_{11} =$ variable*			
$R_{12} = -25.83$			
$D_{12} = 0.65$	$N_7 = 1.80610$	$V_7 = 40.8$	
$R_{13} = 20.20$			
$D_{13} = 2.00$	$N_8 = 1.80518$	$V_8 = 25.4$	
$R_{14} = \infty$			
$D_{14} =$ variable*			
$R_{15} = -70.31$			
$D_{15} = 1.60$	$N_9 = 1.62041$	$V_9 = 60.3$	
$R_{16} = -24.77$			
$D_{16} = 0.12$			
$R_{17} = 164.92$			
$D_{17} = 2.10$	$N_{10} = 1.62041$	$V_{10} = 60.3$	
$R_{18} = -30.79$			
$D_{18} = 0.66$			
$R_{19} = -18.77$			
$D_{19} = 0.65$	$N_{11} = 1.80518$	$V_{11} = 25.4$	
$R_{20} = -24.00$			
$D_{20} = 0.12$			
$R_{21} = 39.44$			
$D_{21} = 2.15$	$N_{12} = 1.62041$	$V_{12} = 60.3$	
$R_{22} = -83.36$			
$D_{22} = 0.61$			
$R_{23} = -32.68$			
$D_{23} = 0.65$	$N_{13} = 1.80518$	$V_{13} = 25.4$	
$R_{24} = -51.95$			
$D_{24} = 16.54$			
$R_{25} = 69.36$			
$D_{25} = 0.65$	$N_{14} = 1.80518$	$V_{14} = 25.4$	
$R_{26} = 33.92$			
$D_{26} = 0.13$			
$R_{27} = 214.90$			
$D_{27} = 1.85$	$N_{15} = 1.71300$	$V_{15} = 54.0$	
$R_{28} = -42.85$			
$D_{28} = 0.15$			
$R_{29} = 41.82$			
$D_{29} = 0.65$	$N_{16} = 1.80518$	$V_{16} = 25.4$	
$R_{30} = 25.93$			
$D_{30} = 0.29$			
$R_{31} = 34.51$			
$D_{31} = 2.10$	$N_{17} = 1.71300$	$V_{17} = 54.0$	
$R_{32} = -106.93$			
$D_{32} = 0.15$			
$R_{33} = 142.16$			
$D_{33} = 0.65$	$N_{18} = 1.80518$	$V_{18} = 25.4$	
$R_{34} = 47.62$			
$D_{34} = 2.10$	$N_{19} = 1.71300$	$V_{19} = 54.0$	
$R_{35} = -102.98$			
$D_{35} = 3.20$			
$R_{36} = 0$			
$D_{36} = 16.00$	$N_{20} = 1.51633$	$V_{20} = 64.1$	
$R_{37} = 0$			

*Variable Interval:

f	8.215	29.119	47.356
D_6	1.197	20.213	24.642

(Continued)

D_{11}	27.216	4.851	1.521
D_{14}	2.097	5.446	4.348

where

R; radius of curvature of each refractive surface.
D; axial thickness or air space of each lens.
N; refractive index of glass composing each lens.
V; Abbe number of glass composing lens.

3,997,245
CLOSE-UP FOCUSING DEVICE IN A PHOTOGRAPHIC LENS ASSEMBLY

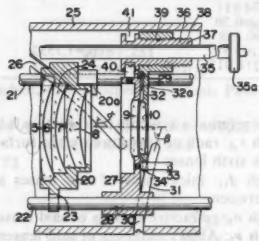
Kyozo Uesugi, Izumi, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 395,452, Sept. 10, 1973, abandoned. This application Mar. 25, 1975, Ser. No. 562,036

Claims priority, application Japan, Sept. 22, 1972, 47-95712

Int. Cl.² G02B 7/10

U.S. Cl. 350—187 **13 Claims**



1. In a photographic lens assembly including a rotatable frame and a plurality of lenses; at least two lens mounts; one of said lenses being supported on one of said lens mounts and another of said lenses being supported on another of said lens mounts; said lens mounts being supported in said frame for movement as a unit in a direction corresponding to the optical axis of said lenses in response to rotation of said frame; the improvement including an improved close-up focusing device comprising:

a shaft mounted in said assembly for rotation independent of the rotation of said frame, said shaft extending in a direction parallel with said optical axis of said lenses, said shaft being longitudinally immovable; and

transmission means operatively coupled to said shaft and said mounts for transducing rotary movement of said shaft into longitudinal movement of one only of said mounts relative to the remainder of said mounts in a direction corresponding to said optical axis of said lenses, and for isolating said shaft from said mounts upon the movement as a unit of said mounts caused by rotation of said frame.

3,997,246
MICROSCOPE ILLUMINATOR

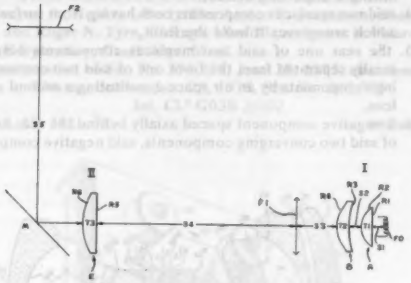
Arthur H. Shoemaker, East Aurora, N.Y., assignor to American Optical Corporation, Southbridge, Mass.

Filed Dec. 29, 1975, Ser. No. 644,687

Int. Cl.² G02B 9/12, 19/00

U.S. Cl. 350—189 **2 Claims**

1. In a microscope illumination system having a filament, a condenser, and a field diaphragm, said condenser having a focal length and a front focal plane, the improvement comprising a collector lens group and a collimator lens E, all aligned on an optical axis, said collector lens group having a plano-concave positive singlet A and a concavo-convex positive singlet B, the parameters of A, B and E being set forth in the following Table where successive lens radii are designated R_1 to R_8, a minus sign (−) applies to centers of curvature on the filament side of the vertex, successive axial thicknesses are



designated T_1 to T_8, successive axial spaces are designated S_1 to S_8, indices of refraction are designated ND_1 to ND_3, Abbe numbers are designated ν_1 to ν_3, indices of refraction and Abbe numbers being absolute values, and wherein F is 9 to 12mm.

Lens	Radius	Thickness	Spacing	Index of Refraction	Abbe Number
			S_1= 0.47619F		
	R_1=∞				
A		T_1= 0.4762F		1.51< ND_1<1.53	ν_1≅59
	R_2= −0.87362F				
			S_2= 0.51714F		
	R_3= −5.8514F				
B		T_2= 0.8762F		1.51< ND_2<1.53	ν_2≅59
	R_4= −1.1899F				
			S_3= 3.1857F		
			S_4= 7.6590F		
	R_5=∞				
E		T_3= 0.6667F		1.51< ND_3<1.53	ν_3≅59
	R_6= 4.5247F				
			S_5=11.71-43F		

wherein the surface of lens B having radius of curvature R_4 is axially-symmetrical, aspheric surface having a conic coefficient k of −1.0 and deformation coefficients d, e, f and g of zero.

3,997,247
UNSYMMETRICAL WIDE ANGLE LENS

Erhard Glatzel, Heidenheim, and Heinz Zajadatz, Essingen, both of Germany, assignors to Carl Zeiss-Stiftung, Oberkochen, Germany

Filed Mar. 18, 1975, Ser. No. 559,585

Claims priority, application Germany, Mar. 18, 1974, 2412898

Int. Cl.² G02B 9/00

U.S. Cl. 350—214 **18 Claims**

1. A wide angle lens comprising

1. at least five components air spaced from each other and containing at least eight individual lens elements,

2. said components including two components each having,

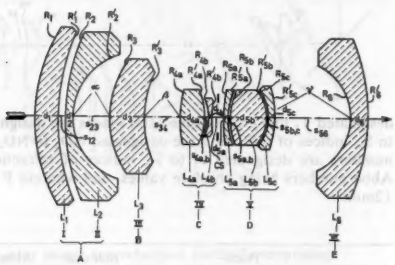
as a whole, a converging action, said two converging components being axially separated from each other by an air space in which a diaphragm may be placed,

3. two meniscus components axially separated from each other by an air space constituting a first air lens, the two meniscus components in combination with each other having a dispersing action,

4. said two meniscus components both having front surfaces which are convex toward the front,

5. the rear one of said two meniscus components being axially separated from the front one of said two converging components by an air space constituting a second air lens,

6. a negative component spaced axially behind the rear one of said two converging components, said negative component having a rear surface which is convex toward the rear,



7. the front one of said two converging components having at least two individual lens elements,

8. the rear one of said two converging components having at least two individual lens elements and at least one cemented surface which is convex toward the front,

said lens being characterized by the fact that

a. said two meniscus components with diverging action are so dimensioned that their mutual refractive power distribution number is substantially within the limits of +1.5977 and −1.3573, and

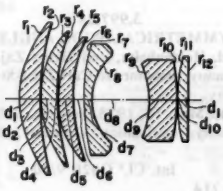
b. the surfaces bounding said first air lens and said second air lens are so dimensioned that the refractive power distribution number of these two air lenses is within the limits of +0.0865 and −1.7466.

3,997,248

LARGE APERTURE TELEPHOTO LENS SYSTEM

Toru Fujii, Tama, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Feb. 13, 1975, Ser. No. 549,480
Claims priority, application Japan, Feb. 14, 1974, 49-17986
Int. Cl.² G02B 9/62
U.S. Cl. 350—215 **2 Claims**



1. A large aperture telephoto lens system comprising a front lens group and a rear lens group wherein said front lens group comprises a first positive meniscus lens, a second positive meniscus lens, a third positive meniscus lens and a fourth negative meniscus lens, and said rear lens group comprises a fifth thick negative meniscus lens with its concave surface positioned on the object side and a sixth positive lens, and said large aperture telephoto lens system having the following numerical data:

	f=100, F/2.0		
r_1=	41.623		
	d_1=7.00	n_1=1.62041	ν_1=60.27
r_2=	119.125		
	d_2=0.16		
r_3=	36.34		
	d_3=5.50	n_2=1.6223	ν_2=53.2
r_4=	68.521		
	d_4=0.16		
r_5=	30.05		
	d_5=5.00	n_3=1.62041	ν_3=60.27
r_6=	49.039		
	d_6=3.78		
r_7=	70.094		
	d_7=2.20	n_4=1.78472	ν_4=25.71
r_8=	18.224		
	d_8=20.00		
r_9=	−44.400		
	d_9=9.49	n_5=1.64769	ν_5=33.8
r_{10}=	−74.931		
	d_{10}=0.20		
r_{11}=	100.258		
	d_{11}=3.51	n_6=1.7552	ν_6=27.51
r_{12}=	−216.912		

wherein the reference symbols represent as follows:

r_1 through r_{12}: radii of curvature on the surfaces of the first through sixth lenses

d_1 through d_{11}: thicknesses of said lenses and air spaces therebetween

n_1 through n_6: refractive indices of said lenses

ν_1 through ν_6: Abbe's numbers of said lenses.

3,997,249

ION EXCHANGEABLE SEGMENT GLASS

David A. Krohn; Robert E. Graf, both of Southbridge, Mass., and Emil W. Deeg, Woodstock, Conn., assignors to American Optical Corporation, Southbridge, Mass.

Filed Oct. 28, 1975, Ser. No. 625,963
Int. Cl.² G02B 5/28
U.S. Cl. 351—166 **4 Claims**

1. A chemically ion exchange-strengthened lanthanum-silicate based ophthalmic segment glass having a compressively-stressed, ion-exchanged surface zone that is at least 60 micrometers in depth, said glass being formed of a lanthanum-silicate glass consisting essentially of alkali metal oxides selected from the group consisting of (1) mixtures of sodium and potassium oxides and (2) mixtures of the oxides of sodium and potassium and other alkali metal oxides wherein said alkali metal oxides are present in the proportions by weight:

sodium oxide	about 7 to about 10 percent
potassium oxide	about 8 to about 12 percent
other alkali metal oxides	up to 5 percent

provided the proportion of total alkali metal oxides present is up to 20 percent, in combination with about 15 to about 35 percent lanthanum oxide; the balance of said glass being essentially about 30 to about 60 percent silica.

3,997,250

HIGH STRENGTH OPHTHALMIC LENS

David A. Krohn; Robert E. Graf, both of Southbridge, Mass., and Emil W. Deeg, Woodstock, Conn., assignors to American Optical Corporation, Southbridge, Mass.

Filed July 2, 1975, Ser. No. 592,703
Int. Cl.² G02B 5/28
U.S. Cl. 351—166 3 Claims

1. A chemically ion exchange-strengthened ophthalmic glass lens having a compressively-stressed, ion-exchanged surface zone that is at least 60 micrometers in depth, said lens being formed of an alkali metal oxide-silicate glass consisting essentially of alkali metal oxides selected from the group consising of (1) mixtures of sodium and potassium oxides and (2) mixtures of sodium and potassium oxides and other alkali metal oxides wherein said alkali metal oxides are present in the proportions, by weight:

sodium oxide, about 7 to about 10 percent,

potassium oxide about 7 to about 11 percent,

other alkali metal oxides up to 5 percent,

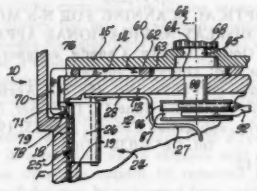
provided the proportion of the total alkali metal oxides present is up to 20 percent in combination with aluminum oxide about 0.2 to about 4 percent, and lanthanum oxide about 3 to about 15 percent, the balance of said glass being essentially silica about 60 to about 68 percent.

3,997,251

MAGAZINE CAMERA

George A. Mitchell, 687 Prospect Crescent, Pasadena, Calif. 91103

Filed Aug. 29, 1975, Ser. No. 608,827
Int. Cl.² G03B 23/02
U.S. Cl. 352—72 12 Claims



1. In a motion picture camera, the combination of

structure forming a film chamber and a mechanism chamber separated by a side wall and each having a front wall,

a film aperture in the front wall of the film chamber with gate means for guiding a film past the film aperture,

intermittent mechanism including a claw arm having a main body mounted in the mechanism chamber and a forward portion projecting forwardly through a fitting slot in the front wall of the mechanism chamber,

claw means carried by said forward portion of the claw arm and extending rearwardly through a clearance aperture in the front wall of the film chamber for intermittently entering a film sprocket hole from the front face of the film to advance the film in said gate means,

a shaft journaled on a shaft axis generally perpendicular to said side wall,

first cam means carried by the shaft in the mechanism chamber for engaging and driving the claw arm,

registration means mounted in the film chamber for movement between film registering and film releasing positons,

second cam means carried by the shaft in the film chamber for engaging and driving the registration means in timed relation to the intermittent mechanism,

said registration means including means in the film chamber for manually overriding said second cam means to release the film from the registration means for threading,

the film chamber having a door for providing manual access to the film gate and the overriding means,

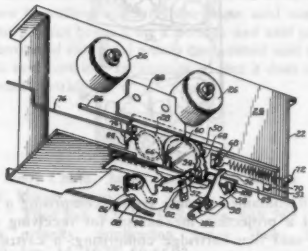
the mechanism chamber enclosing said first cam means and said body of the claw arm in substantially sealed relation in all positions of the door.

3,997,252

FILM CASSETTE CONDITIONING MECHANISM

Kenyon A. Hapke, Libertyville; Lester V. Jorgensen, Skokie, and Roger N. Tyre, Chicago, all of Ill., assignors to Polaroid Corporation, Cambridge, Mass.

Continuation of Ser. No. 374,287, June 28, 1973, abandoned.
This application Jan. 21, 1975, Ser. No. 542,783
Int. Cl.² G03B 23/02
U.S. Cl. 352—72 4 Claims



1. In a processor/projector apparatus having plural operating modes and adapted to receive a film cassette having an integral, spring-loaded pressure plate over which the film is movable, a conditioning mechanism for conditioning the film cassette for plural operating modes comprising:

a housing providing a slot for receiving said cassette and a film gate surface for cooperating with said pressure plate to closely confine the film therebetween during a projection mode;

an inlet light port in said housing for the passage of a projection lamp light beam to said cassette during a projection mode;

an outlet light port in said housing for the passage of the projection lamp light beam from said cassette during said projection mode;

a first blinder mounted externally of said cassette in proximity to said inlet light port and movable between a closed position for preventing the passage of light through said inlet light port and an open position for permitting the passage of light through said inlet light port;

a second blinder mounted externally of said cassette in proximity to said outlet light port and movable between a closed position for preventing the passage of light through said outlet light port and an open position for permitting the passage of light through said outlet light port;

pressure plate displacing means movable in a direction perpendicular to the plane of said film gate surface between an active position and a retracted position, said spring-loaded pressure plate displacing means being effective in moving to said active position to displace said pressure plate away from said film gate surface;

slide cam means movable in a direction parallel to the plane of said film gate surface for camming the movement of said pressure plate displacing means between said active position and said retracted position; and

actuator means including a single rotary timing cam and a cam follower means spring-biased into engagement with the cam surface of said rotary timing cam for translating rotary motion of said timing cam surface into reciprocal motion transmitted to said first and second blinders and to said slide cam means for effecting correlated movement of said first and second blinders to their respective closed positions and said slide cam means to its active position for a development mode and for effecting correlated movement of said first and second blinders to their

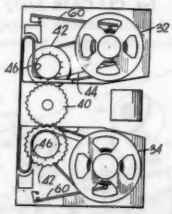
respective open positions and said slide cam means to its retracted position for a projection mode.

3,997,253

SELF CONTAINED FILM STRIP DISPLAY APPARATUS

Henri M. Payot, Sarasota, Fla., assignor to Lawrence Peska Associates, Inc., New York, N.Y., a part interest

Filed Mar. 24, 1975, Ser. No. 561,380
Int. Cl.² G03B 21/10
U.S. Cl. 352—72 1 Claim



1. A self contained display system comprising a film cartridge and a projection mechanism for receiving said film cartridge; said film cartridge comprising: a cartridge body comprising first and second fixedly spaced apart sections defining a projection window therebetween; a perforated film strip in said cartridge body; supply and takeup reels for said film strip respectively mounted for rotation in said first and second sections; first and second drums carried for rotation respectively in said first and second sections; first belt means coupling said first drum and said supply reel for joint rotation; second belt means coupling said second drum and said takeup reel for joint rotation; said film strip being trained from said supply reel to said takeup reel by passing tangent to said first drum, across said projection window and then tangent to said second drum; fingers extending radially from said first and second drums for drivingly engaging the perforations in said film; and first and second gears respectively carried coaxially by said first and second drums; said projection mechanism comprising: a casing; a motor driven gear carried by said casing for simultaneously drivingly engaging said first and second gears of said cartridge for advancing said film strip past said projection window; light source and focussing means carried by said casing adjacent said projection window for forming an image in cooperation with said film strip; a backlightable translucent screen along one wall of said casing for receiving said image; and first and second prisms positioned in said casing for directing said image to the back of said screen.

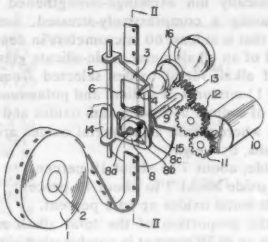
3,997,254

FILM FEED APPARATUS

Yasutsugu Yamada, Kawasaki, and Katuhiko Toda, Kanagawa, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 23, 1973, Ser. No. 390,708
Claims priority, application Japan, Aug. 25, 1972, 47-85063
Int. Cl.² G03B 1/22
U.S. Cl. 352—194 4 Claims

1. A power transmission apparatus for use in a motion picture camera, a motion picture projector or the like which is actuated by a driving force and includes a driving mechanism for supplying the driving force, and a plurality of interengageable driving gears arranged to be driven by said driving mechanism, wherein the improvement comprises that the plurality of said driving gears includes at least one of said gears having a reservoir formed therein and arranged to contain a lubricant, a guide passage formed in said gear containing said lubricant reservoir with said guide passage extending between said reservoir and the bottom surface of said gear between adjacent teeth thereon, a grease-like lubricant within said reservoir which has a variable viscosity when exposed to the influence of frictional heat developed when the plurality of driving gears are engaged with one another with the lubricant being supplied from said reservoir of said gear through said guide passage by virtue of the centrifugal force generated by the rotational motion of said gear containing said reservoir, and the viscosity of said lubricant is also variable in accordance with the speed of revolution of said gear containing said reservoir when it is in rotational motion and said lubricant being supplied from said reservoir in said gear in accordance with the speed of revolution of said gear by virtue of the centrigugal force developed as it rotates, said lubricant reservoir is located eccentrically to the axis of revolution of said gear, and a body of felt positioned within said reservoir and impregnated with said grease-like lubricant.

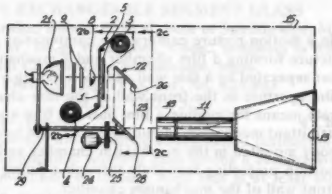


3,997,255

ARCUATE OPTICAL SCANNING FOR N-S MOVEMENT IN A MAP DISPLAY NAVIGATIONAL APPARATUS

Hendrik Van Oosten, Ottawa, Canada, assignor to Control Data Canada, Ltd., Ottawa, Canada

Continuation-in-part of Ser. No. 458,735, April 8, 1974, abandoned. This application June 19, 1975, Ser. No. 588,455
Claims priority, application Canada, June 15, 1973, 174122
Int. Cl.² G03B 21/00
U.S. Cl. 353—12 2 Claims



1. A navigational apparatus for use in a piloted craft comprising:

a frame;

a light projector, mounted for arcuate movement thereof, at one end of said frame and a display screen mounted at the other end of said frame defining a light path therebetween;

a drive sprocket mounted on said frame to move a film across said light path in a film plane perpendicular to light from said projector;

a plate positioned adjacent said film defining a light passing arcuate aperture in said light path, said plate being fixedly mounted on said frame in a plane adjacent and parallel said film plane;

optical scanning means mounted on said frame on the opposite side of said plate from the light projector for arcuate movement therewith and mechanically linked thereto for

synchronous parallel arcuate movement in a plane parallel to said film plane to thereby arcuately scan across said film;

cam means mechanically linked to said optical scanning means and responsive to displacement thereof to alter the position of said drive sprocket and compensate for arcuate displacement in said scanning means, thereby providing a linear scan longitudinally and transversely in said film plane; and

focusing means between said scanning means and said display screen to focus a film image on said screen.

3,997,256

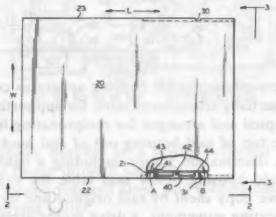
MICROFICHE CARTRIDGE

Thomas R. Wells, Des Plaines, Ill., assignor to Bell & Howell Company, Chicago, Ill.

Filed Dec. 16, 1974, Ser. No. 532,799

Int. Cl.² G03B *23/08*

U.S. Cl. 353—27 A **9 Claims**



1. A microfiche cartridge comprising means for locking a microfiche library file into a captured position within said cartridge, means for selectively enabling said cartridge to be positioned in a reader to release said locking means and enable an extraction of a selective one microfiche from a library file, and means comprising contours on said cartridge for cooperating with complimentary contours on a reader for precluding removal of said cartridge from a reader while said cartridge is in a position which releases said capture means whereby said cartridge cannot be removed from a reader while a microfiche may be extracted from said library file.

3,997,257

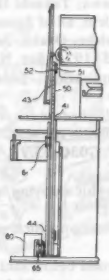
SELECTION FOR MICROFICHE CARTRIDGE

Thomas R. Wells, Des Plaines, Ill., assignor to Bell & Howell Company, Chicago, Ill.

Filed Dec. 16, 1974, Ser. No. 532,800

Int. Cl.² G03B *23/08*

U.S. Cl. 353—27 R **7 Claims**



1. A system for selecting a microfiche from a library file contained inside a cartridge, said microfiche being suspended in spaced parallel relationship within said cartridge, latch means for normally locking said microfiche in said cartridge, elevator means formed to receive and support said cartridge with said microfiche disposed in a planar orientation, reciprocally movable microfiche extractor means positioned at a predetermined location adjacent said cartridge, said extractor means reaching into said cartridge and pulling said microfiche from and returning it to said cartridge, planar position means for moving said elevator means to a selected position adjacent said extractor means, said elevator means motion being in a direction perpendicular to said planar orientation, means for unlocking said latch means responsive to said motion of said elevator means, and means responsive to movement of said extractor means for selectively and continuously locking said elevator means throughout the entire period while the extractor means is pulling a microfiche from said cartridge far enough to project beyond the cartridge and said period continuing until said extractor means has pushed said microfiche back into said cartridge far enough so that it does not project beyond said cartridge.

3,997,258

FILM READER

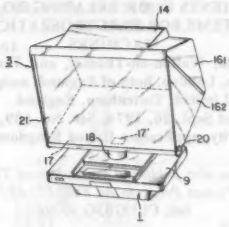
Kokichi Omi, Chofu, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 13, 1975, Ser. No. 549,767

Claims priority, application Japan, Feb. 20, 1974, 49-20280; Jan. 14, 1975, 50-6692

Int. Cl.² G03B *21/24, 23/08*

U.S. Cl. 353—79 **15 Claims**



1. An image observing device comprising:

a screen;

a housing containing said screen therewith and also having an observation port, said housing including a fixed portion and a collapsible portion which includes a rear wall pivotably mounted on said fixed portion, a top wall fixed on said rear wall, and opposite side walls fixed on said rear wall and top wall, said collapsible portion being movable between a first position wherein said collapsible portion is away from said screen and a second position wherein said collapsible portion is close to said screen, at least a portion of said side walls being flexible so as to be bent when urged against a surface on which said image observing device is located.

3,997,259

APPARATUS FOR REDUCING IMAGE BACKGROUND IN ELECTROSTATIC REPRODUCTION MACHINES

Gopal C. Bhagat, Rochester, N.Y., assignor to Xerox Corporation, Stamford, Conn.

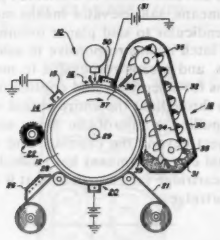
Filed Nov. 8, 1973, Ser. No. 414,016

Int. Cl.² G03G *15/22*

U.S. Cl. 355—3 R **5 Claims**

1. In an electrostatic reproduction machine, the combination of: a bare photoconductive member, first charging means to place an electrostatic charge on the surface of said photoconductive member in preparation for imaging, exposure

means independent of any charging means spaced downstream of the first charging means to expose without recharging said charged photoconductive member to an original being reproduced and thereby change charges on the surface of the charged member to form a latent electrostatic image of the original on the surface of said photoconductive member, and, second charging means spaced downstream of said exposure



means to uniformly expose the surface of said photoconductive member to a charge opposite in polarity to the charge produced by said first charging means to thereby uniformly reduce charges remaining on the surface of said photoconductive member following exposure by said exposure means and reduce image background without adversely affecting image contrast.

3,997,260

IMPROVEMENTS IN OR RELATING TO SCANNING LENS SYSTEMS FOR ELECTROSTATIC COPYING MACHINES

Nandor Mihalik, Walton-on-Thames, and Terence Cunningham Frostick, London, both of England, assignors to Gestetner Copiers Limited, Tottenham, England

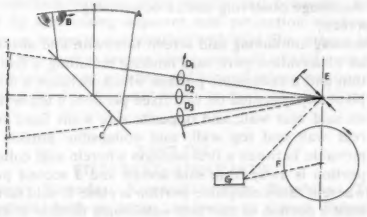
Filed Sept. 26, 1974, Ser. No. 509,474

Claims priority, application United Kingdom, Oct. 2, 1973, 46011/73

Disclosure was also published under second Trial Voluntary Protest Program on Feb. 17, 1976

Int. Cl.² G03G *15/04*

U.S. Cl. 355—8 **12 Claims**



1. A copying machine including a platen; a surface for the platen for supporting an object to be copied; a rotatable drum; a photo-conductive surface for said drum for receiving an image of an object supported on the platen; a mirror positioned below and spaced from the platen and inclined with respect thereto; a lens mounted for movement along an arcuate path about an axis and constrained to have that axis intersecting the optical axis of the lens, to scan the image reflected in the mirror of an object on the platen; and a second mirror on and mounted for rotation about, the axis of rotation of the lens to reflect light passing from the lens onto the photoconductive surface of the drum; and wherein the first said mirror is dimensioned and inclined with respect to the platen so that substantially the whole of the perpendicular projection of said surface of the platen falls on said first mirror.

3,997,261

ELECTROPHOTOGRAPHIC COPYING APPARATUS

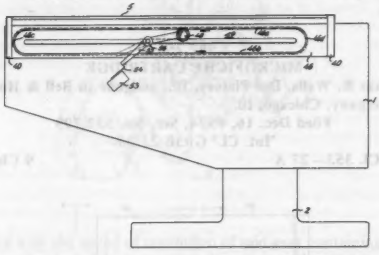
Karl Gustav Zeuthen, Gentofte, Denmark, assignor to Zeuthen & Aagaard A/S, Glostrup, Denmark

Filed Oct. 7, 1975, Ser. No. 620,254

Claims priority, application Denmark, Oct. 15, 1974, 5397/74; Germany, Jan. 14, 1975, 2501236

Int. Cl.² G03G *15/28*; **G03B** *27/50, 27/10*

U.S. Cl. 355—8 **5 Claims**



1. An electrophotographic copying apparatus comprising a housing, a partially transparent table for supporting an original to be copied and arranged for reciprocating linear movement on the top of said housing out of and back to a home position, an illumination station including a light source arranged in said housing below said table for exposure of a photosensitive copy sheet by said original line by line during said reciprocating movement, a drive motor arranged in said housing, and transmission means for transforming the rotary motion of said motor into said reciprocating movement of the table, said transmission means including a tooth rim connected with said table and having a number of teeth arranged internally along an endless path comprising two parallel rectilinear runs of a length corresponding to the stroke of said table and curved runs interconnecting said linear runs at either end thereof, a drive shaft coupled to said motor, a pinion of a diameter less than the distance between said parallel teeth runs and engaging the teeth of said tooth rim, and being secured on said drive shaft, means for journalling said drive shaft relative to said housing so as to allow vertical shifting of said pinion from one to the other of said rectilinear teeth runs, a guide wheel mounted rotatably on the drive shaft outside said pinion, and an endless guide groove formed inside said tooth rim in parallel relationship with said endless teeth path to form a track for said guide wheel.

3,997,262

ELECTROPHOTOGRAPHIC COPYING APPARATUS

Yasuhiko Doi, Toyokawa; Shunji Yamamoto, Shinshiro; Osamu Okada, Toyokawa; Takashi Hikosaka, and Masamichi Hayashi, both of Aichi, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Aug. 23, 1974, Ser. No. 500,171

Claims priority, application Japan, Sept. 7, 1973, 48-101372

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 30, 1976

Int. Cl.² G03G *15/18, 15/00*

U.S. Cl. 355—11 **5 Claims**

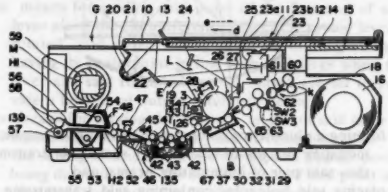
1. An electrophotographic copying apparatus of the image transfer type, comprising:

a reciprocatable platform on which an original to be copied may be placed;

a rotatable drum disposed below said platform and having a photoreceptor surface onto which an image of the original to be copied is projected, said drum being adapted to rotate synchronously with movement of said platform disposed above said drum;

means disposed around said drum and including a corona charging means for applying uniform charges onto said drum, an exposure slit means through which an image of the original is projected by reflecting the image through a plurality of mirrors and a lens onto said drum, an electrostatic latent image being formed thereon, an image transfer means for transferring the thus formed electrostatic latent image onto a copying paper, a separating means for separating said copying paper from the drum, and an erasing means for erasing residual charges from the drum;

a paper feeding means disposed along a substantially V-shaped path and including a supporting means, a plurality of pairs of rollers arranged between said image transfer means and said supporting means for supporting the copying paper in the form of a roll, said arrangement of rollers forming the feeding path of said copying paper



substantially parallel to a finally reflected path of the original image through said slit;

a cutting means disposed along said feeding path for cutting said copying paper;

a developing means including developing solution disposed at about an apex of said V-shaped path;

a feeding path extending upward from said developing means so as to substantially form the V-shaped path and including a squeezing roller for squeezing excess developing solution from a developed copying paper, an absorbing roller for absorbing excess developing solution from the copying paper, and a fixing device for heat fixing said developed image on the copying paper, said drum being positioned along the feeding path between said pairs of rollers and said developing means, having a diameter of 50 to 100 mm and adapted to rotate more than once for forming an electrostatic latent image of the original.

3,997,263

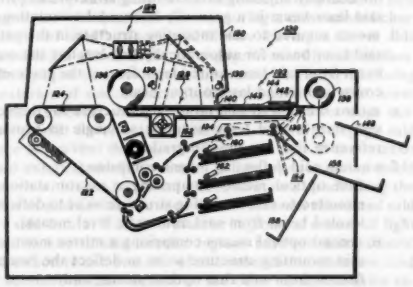
BI-DIRECTIONAL COPIER OUTPUT

Denis J. Stemmle, Williamson, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Sept. 22, 1975, Ser. No. 615,317

Int. Cl.² G03B 27/52, 27/70; B65H 29/58

U.S. Cl. 355—24 **14 Claims**



1. In a copying system in which document handling means are provided for recirculatingly moving a set of documents in serial sequential order past optical imaging means for pre-collated sequential copying of the documents onto the faces of individual copy sheets in sequential collated sets of said copy sheets, wherein guide means provide a copy sheet output path for said copy sheets, and wherein said document handling means and said optical imaging means are adapted to alternatingly recirculate said documents in forward serial order and then in reverse serial order relative to said optical imaging means to provide bi-directional pre-collated copying wherein the copy sheets of alternate copy sheet sets are alternately in forward and reverse serial order of collation, the improvement comprising:

copy sheet collection means for collecting said collated copy sheet sets from said copy sheet output path; and

copy sheet output control means for alternatingly switching said output path of said copy sheets to said copy sheet collection means in response to said alternation between said forward and reverse serial order of copying of said documents for inverting said copy sheets in said reverse serial order relative to said copy sheets in said forward serial order to establish forward serial order for both.

3,997,264

ENLARGING LENS BARREL

Yoshiro Noguchi, Sakai, and Yukio Maekawa, Osaka, both of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

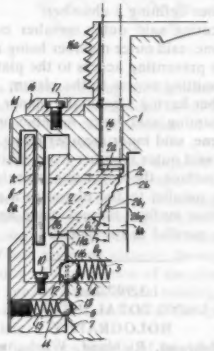
Continuation of Ser. No. 467,987, May 8, 1974, abandoned.

This application July 16, 1975, Ser. No. 596,341

Claims priority, application Japan, May 14, 1973, 48-57141; May 14, 1973, 58-57142

Int. Cl.² G03B 27/52

U.S. Cl. 355—61 **18 Claims**



1. An enlarging lens barrel including an adjustable aperture diaphragm for use in an enlarger having a light source comprising:

an inner sleeve having an opening at a predetermined circumferential position thereof and a small guide passageway adapted to guide light from the enlarger light source toward said opening;

a light guide disposed within said opening and having a terraced reflecting surface including alternate side-by-side first light reflecting unit surfaces inclined in a manner to reflect the light traversing said guide passageway toward the outside of said opening and second surfaces substantially parallel with the advancing direction of the light traversing said guide passageway, said first light reflecting unit surfaces having a combined overall length greater than the width of said guide passageway;

a diaphragm setting ring rotatable along the outer circumferential surface of said inner sleeve and coupled to deter-

mine the aperture of the said diaphragm in accordance with the angular position of said setting ring; and

an indicating ring at least part of which is light transmissive and provided with a series of characters representing aperture values, said indicating ring being mounted on said diaphragm setting ring and positioned in front of said opening to exhibit the character of said series of characters which represents the aperture value corresponding to the respective adjusted aperture of said diaphragm.

3,997,265

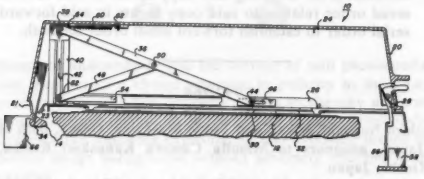
PLATEN COVER

Sukumaran K. Menon, and James E. Hutton, both of Webster, N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Sept. 2, 1975, Ser. No. 609,336

Int. Cl.² G03B *27/62*

U.S. Cl. 355—75 **10 Claims**



6. An electrophotographic printing machine of the type in which an original document disposed on a generally planar transparent platen secured to the machine frame has a preselected number of copies thereof reproduced, wherein the improved cover apparatus for holding the original document thereon includes:

an outer member defining a chamber;

means for securing said outer member movably on the machine frame, said outer member being movable from a first position preventing access to the platen to a second position permitting access to the platen;

an inner member having a generally planar surface; and

means for mounting said inner member movably on the machine frame, said inner member being movable in the chamber of said outer member from a first position with the planar surface thereof being closely adjacent and substantially parallel to the platen to a second position with the planar surface thereof being spaced from and substantially parallel to the platen.

3,997,266

LENS TESTING USING TOTAL INTERNAL REFLECTION HOLOGRAPHY

Bernard P. Hildebrand, Richland, Wash., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

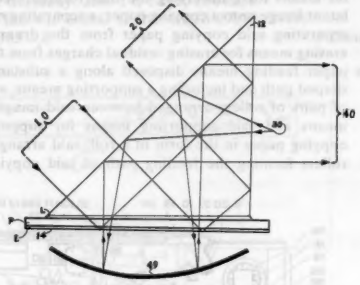
Filed Sept. 26, 1975, Ser. No. 617,204

Int. Cl.² G01B *9/02*; G03H *1/04*

U.S. Cl. 356—109 **11 Claims**

1. In a process for holographically testing concave and convex surfaces wherein a hologram serves as both a master and an illuminating source for said surfaces to be tested, said process requiring no overpower optics, mirrors or beamsplitters, said process comprising the steps of

making a hologram of a master surface by means of a first beam and a second beam, illuminating said master surface by said first beam thru a prism and an unbacked photographic plate, said prism having a first side, an hypotenuse side, and another side adjacent said photographic plate, a liquid couplant interposed between said another side and said photographic plate, an emulsion layer disposed on opposite side of said plate and facing said master surface, said first beam diverging from a point near focal plane of said master surface and directed into said first side of said prism to be reflected onto said master surface, and said second beam being collimated and directed into said hypotenuse side of said prism for deflection thereout after striking emulsion-air interface,



forming a plurality of holograms on said photographic plate including images of said master surface in transmission thru said pair of illuminating beams, and

placing said hologram containing said transmission holograms before a concave or convex surface for holographically testing the surfaces thereof.

3,997,267

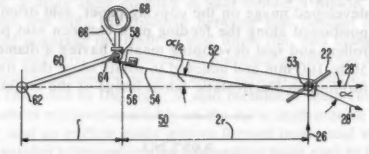
LASER APPARATUS FOR PROJECTING A NARROW BEAM OF LIGHT AS A REFERENCE LINE

Viktor Met, Palo Alto, Calif., assignor to Micro-Grade Laser Systems, Mountain View, Calif.

Filed June 21, 1972, Ser. No. 264,945

Int. Cl.² G01B *11/26*; G01C *1/00*; G02B *27/32*

U.S. Cl. 356—138 **8 Claims**



1. Laser apparatus for projecting a narrow beam of light as a reference line at a desired grade comprising:

a. a mounting structure;

b. a laser source rigidly secured to said mounting structure for generating a narrow beam of light;

c. leveling means associated with said mounting structure for coarsely adjusting said mounting structure to provide said laser beam in a generally horizontal orientation;

d. means secured to said mounting structure in the path of said laser beam for automatically fine leveling the output beam from said laser source regardless of the grade of the coarsely oriented laser output beam;

e. means secured to said mounting structure for deflecting said fine leveled laser beam at an angle to provide a reference line at a desired grade;

f. wherein said deflecting means comprises:

i. first optical means comprising a mirror stationarily mounted to said mounting structure so as to deflect the leveled beam from said automatic level means;

ii. second optical means comprising a mirror mounted to said mounting structure so as to deflect the beam deflected from said first optical means; and

iii. means for rotating said second optical means to provide the desired deflection angle from horizontal, said

rotating means including means for rotating said second mirror at an angle $\alpha/2$ for a desired output angular deflection of α from horizontal;

g. a linear measuring and display device for determining the angular setting of the output reference beam; and

h. means for accurately converting the angular setting of said rotatable second mirror to a linear displacement for operation of said linear measuring and display device, said converting means comprising:

i. a lever having one end secured to the axis of said rotatable second mirror, said lever having a length at one point of $2r$ when said rotatable second mirror is positioned to provide a horizontal output reference beam, where $r = 100\ \Delta x$, and Δx is equal to a unit of display of the linear measuring and display device;

ii. means for rotating said lever about its axis to thereby rotate said second mirror;

iii. means for guiding said point of the free end of said lever along the circumference of a circle as said lever is rotated, said circle having a radius of length r and having its centerpoint in line with said lever when the lever and said rotatable second mirror are set to provide a horizontal output reference beam;

iv. means for varying the effective length of said lever to enable said point to follow said circular path; and

v. the setting of said linear measuring and display device being determined by the displacement of said point in a direction perpendicular to the lever when said lever and rotatable second mirror are set to provide a horizontal output reference beam.

3,997,268

DEVICE FOR DETERMINATION OF LAYER THICKNESS, OR ALTERNATIVELY, MEASUREMENT OF SURFACE TOPOGRAPHY

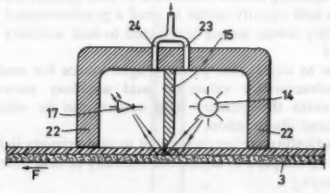
Gerdt Fladda, Taby, and Lennart Eriksson, Vallentuna, both of Sweden, assignors to Svenska Traforskningsinstitutet, Stockholm, Sweden

Filed Apr. 23, 1975, Ser. No. 570,914

Claims priority, application Sweden, Apr. 26, 1974, 7405630

Int. Cl.² G01B 11/06

U.S. Cl. 356—161 **15 Claims**



1. A unitary measuring device adapted to be placed in firm engagement with a surface for measuring a dimensional characteristic of said surface, said device having a lower side adapted to be placed in direct engagement with said surface, a light opaque external shield structure completely enclosing the exterior of said unitary device except for its said lower side, said external shield structure having a lower edge surrounding said lower side and adapted to firmly engage said surface to prevent the ingress of external light to the interior of said external shield structure, a light opaque inner shield structure within said external shield structure subdividing the interior of said device bounded by said external shield and said lower side into at least two interior regions, a source of light located in one of said interior regions between said external shield structure and one side of said inner shield structure, and light sensitive means located in the other of said interior regions between said external shield structure and the other side of said inner shield structure, said inner shield structure being positioned transverse to said lower side and having a light opaque lower edge disposed along said surface being measured whereby, when said lower side of said device is in engagement with said surface, luminous flux emitted by said light source in said one region may reach said light sensitive means located in the other of said regions only by transfer through a path extending through the portion of said lower side underlying said one region to a location disposed below said lower edge of said inner shield structure and then to the portion of said lower side underlying said other region and to said light sensitive device, and indicator means coupled to said light sensitive device and responsive to the portion of the total luminous flux emitted by said light source which reaches said light sensitive device through said path for indicating said dimensional characteristic of said surface.

3,997,269

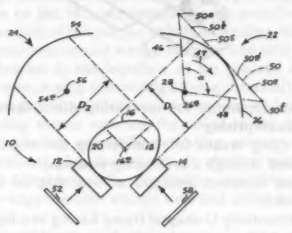
SCALING APPARATUS WITH LINEARIZATION COMPENSATION

Clifford H. Moulton, Sunriver, Oreg., assignor to Dyna-Tech Corporation, Portland, Oreg.

Filed Apr. 28, 1975, Ser. No. 572,221

Int. Cl.² G01B 11/08

U.S. Cl. 356—167 **12 Claims**



1. Apparatus for determining the locations of, and relative spacing between, the opposite sides of an article in a work station regardless of the exact position of the article in the station, said apparatus comprising

a parabolic reflector positioned adjacent said station for viewing an article disposed therein,

electro-optical scanning means including a substantially constant-speed rotary scanning element located adjacent the focal point of said reflector, said scanning means, with rotation of said scanning element throughout a scanning sweep portion of a revolution of the element, being constructed to generate an electrical scaning signal indicative of the locations in said station of the opposite sides of a viewed article,

a changeable-frequency source of electrical pulses,

frequency-change means operatively connected both to said scanning means and to said source for causing, during movement of said scanning element throughout a scanning sweep portion of a revolution, changes in the operating frequency of the source, whereby throughout the scanning sweep portion the time interval between each pulse produced by the source is directly relatable substantially the same distance in said station viewed by the reflector and scanned by the element during the interval,

said frequency-change means comprising a frequency-control counter for contiuously counting the pulses produced by said source throughout a scanning sweep portion of a revolution of said scanning element, and means operatively interconnecting said changeable-frequency source and said frequency-control counter for determining the operating frequency of the source in accordance solely with the particular absolute count then stored in said frequency-control counter, and

a pulse counter operatively connected to said source and to

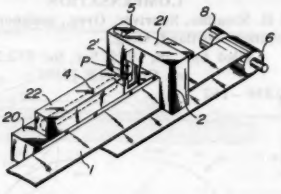
said scanning means, operable during a scanning sweep portion of a revolution of said element, to accumulate and store a count of only those pulses which are produced by the source during generation by said scanning means of a scanning signal, regardless of the time relations of the beginnings and endings of a scanning sweep portion of a revolution of said element and of the generation of a scanning signal.

3,997,270

APPARATUS FOR MEASURING DIMENSIONS OF TRAVELLING OBJECTS

Toshio Suzuki, Tokyo, Japan, assignor to Shinri Kogyo Company Limited, Tokyo, Japan

Filed July 14, 1975, Ser. No. 595,831
Claims priority, application Japan, Aug. 23, 1974, 49-96903
Int. Cl.² G01B 11/04
U.S. Cl. 356—167 2 Claims



1. An apparatus for measuring dimensions of travelling objects comprising:

conveying means for transferring the objects to be measured through a measuring position;

a base member arranged at one side of said conveying means;

a substantially U-shaped frame having two leg portions, one of which is secured to the base member and the other leg portion is of a free end;

a laser light source for producing a laser light beam and secured to the base member;

a pair of plane mirrors each of which is arranged on the respective one of said leg portions, said plane mirrors being so arranged with respect to each other that the laser light beam is incident upon one of said plane mirrors and is repeatedly reflected between said plane mirrors so as to form a light screen at said measuring position;

photoelectric converting means arranged to receive the laser beam leaving the plane mirrors and produce a first signal representing time intervals during which said objects are in the light screen;

a pulse generator for producing pulses the number of which is related to amounts of movements of said objects by means of the conveying means;

a pulse counter for counting the number of those pulses which are generated in the time intervals during which said photoelectric converting means produce said first signal;

means for calculating the dimensions of the objects on the basis of the count values of said pulse counter; and

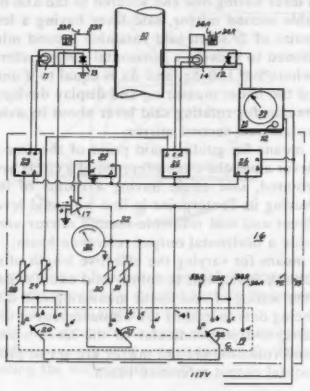
means for securing said plane mirrors to said leg portions of the frame in an adjustable manner, said adjustably securing means including a verticle angle adjusting plate onto which the plane mirror is cemented, a horizontal angle adjusting plate is pivotally coupled, a spring member disposed between these angle adjusting plates, a vertical angle adjusting member provided in the vertical angle adjusting plate at an end position which is remote from the pivotally coupled position, means for securing said horizontal angle adjusting plate to the leg portion in such a manner that the horizontal angle adjusting plate can be tilted with respect to the leg portion so as to adjust the horizontal angle of the plane mirror.

3,997,271

DEVICE FOR CALIBRATING A TRANSMISSOMETER

Richard D. Brugger, 4818 Walker Blvd., Erie, Pa. 16509; Robert H. Wager, Jr., Passaic and Richard Krukowski, 205 Washington Ave., both of Chatham, N.J. 07928 Chatham, N.J. 07928

Filed Mar. 10, 1975, Ser. No. 557,030
Int. Cl.² G01N 21/22, 21/12
U.S. Cl. 356—201 10 Claims



1. A device for recalibrating a transmissometer having a primary light source supported on a first side of a duct and a primary detector supported on a second side of said duct and an opacity meter connected to said primary detector with a light path through said duct from said primary light source to said primary detector comprising,

an auxiliary detector adapted to move into said light path and to be supported at said first side of said duct between said primary light source and said duct,

an auxiliary light source having a known output, and means to move said auxiliary source into a position between said duct and said primary detector,

and adjusting means connected to said opacity meter to set the said opacity meter to read a predetermined value,

auxiliary meter means connected to said auxiliary detector and

means to adjust said primary light source for reading of a predetermined value on said auxiliary meter means wherein the primary light source can be adjusted for proper illumination,

said adjusting means connected to said primary light source being adapted to adjust the intensity of said primary light source,

and said adjusting means connected to said opacity meter being adapted to adjust said opacity meter to give a reading of a predetermined value on said opacity meter, as if a clear gas were in said stack and as if said auxiliary detector and said auxiliary light source were removed from said light path.

3,997,272

MAGNETIC STIRRER IMPROVEMENT

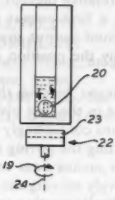
Kenyon P. George, Los Altos, Calif., assignor to Varian Associates, Palo Alto, Calif.

Filed Dec. 15, 1975, Ser. No. 640,816
Int. Cl.² G01N 1/10
U.S. Cl. 356—246 9 Claims

1. In an optical absorption cell for use in optical absorption spectroscopy, said cell being characterized by a non-magnetic container for fluidic samples to be analyzed, said container having a generally rectangular transverse cross-section of

interior dimensions A × B, where A is relatively large compared with B; and a magnetic stirrer body positioned at the bottom of said container for effecting agitation of said sample by responding to a rotating magnetic field externally applied by magnetic field sources rotating about a vertical axis beneath said container; the improvement wherein:

said magnetic stirrer body is of generally cylindrical cross-section, the major diameter of said cylinder being slightly less than the internal dimension B of said container, and the axial length of said cylinder being slightly less than the internal dimension A; said body being oriented with its



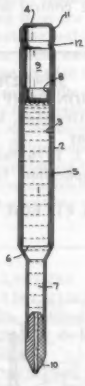
said axis in a generally horizontal plane and the lateral periphery of said body thereby lying closely adjacent to the internal walls of said container; and wherein said body carries permanent magnet means toward one axial end thereof, said magnet means being oriented to provide a pair of opposite magnetic poles toward alternate sides of the axis of said cylinder; whereby said externally applied rotating magnetic field alternately attracts and repels said magnetic poles of said body, and whereby said body by virtue of the constraints imposed by said proximate cell walls rotates about its said axis in response to said attraction and repulsion.

3,997,273

BALLPOINT PEN CARTRIDGE

Werner Germann, Lugano-Cassarate, Switzerland, assignor to Ananda Anlageanstalt, Vaduz, Liechtenstein

Filed June 18, 1973, Ser. No. 370,738
Int. Cl.² B43K *7/08*
U.S. Cl. 401—190 **8 Claims**



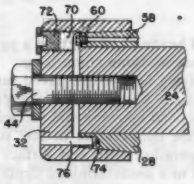
1. A ball point marking instrument comprising an outer tube having each end open, a ball point registered adjacent to one end of said outer tube, a marking liquid within said outer tube, said marking liquid in contact with the ball of said ball point, and an inner tube having one open end and one closed end and initially containing a gas, said inner tube being inserted into sealing relation with said outer tube to a depth at which the open end penetrates said marking liquid so that the gas within said inner tube is compressed in a space between said marking liquid and said closed end to exert pressure on said marking liquid and to thereby force said marking liquid against said ball point.

3,997,274

SEALED ACCESS FOR HINGE PIN LUBRICATION

Lowell P. Iverson, Aurora, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Apr. 5, 1976, Ser. No. 673,507
Int. Cl.² B25G *3/00*; F16D *1/00*; F16G *11/00*
U.S. Cl. 403—10 **7 Claims**



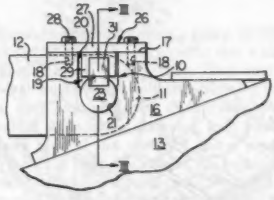
1. In a hinge pin construction including a pin adapted to journal an arm or the like, an annular wedge member associated with one end of the pin, an axially extending lubricant passage in at least one of said wedge member and said pin for directing a lubricant to the interface of the pin and an arm journalled thereon, a plug removably closing the axially outer end of the passage and a collet received on said wedge member and including means securing the collet to the pin, the improvement including an axially extending passage in said collet, an additional plug for selectively closing said collet passage, and keying means for precluding assembly of said collet to said wedge member except with said collet lubricant passages aligned.

3,997,275

FORCE TRANSMITTING CONNECTION

Roger R. Mitchell, Joliet, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Mar. 25, 1976, Ser. No. 670,308
Int. Cl.² F16C *11/00*
U.S. Cl. 403—14 **6 Claims**



1. A force transmitting connection for interconnecting a pair of members to transmit force therebetween, comprising:

bracket means secured to one of the members including a pair of spaced apart brackets disposed on opposite sides of the other member, each of the brackets having an open-ended substantially U-shaped slot formed therein;

force transmitting means connected to and projecting outwardly from opposite sides of the other member and nested within the U-shaped slots; and

retainer means bridging the space between the brackets and removably secured thereto, said retainer means having a pair of spaced projections disposed on opposite sides of the other member and embracing the force transmitting means to retain the force transmitting means within the slots.

3,997,276

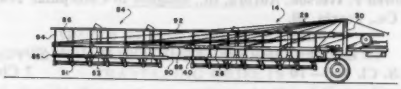
ROAD MAINTENANCE MACHINE AND METHODS

James A. Jackson, Sr., 8330 Cantrell Road, Little Rock, Ark. 72207

Division of Ser. No. 448,404, March 5, 1974. This application Oct. 11, 1974, Ser. No. 514,271

Int. Cl.[2] E01C 7/06

U.S. Cl. 404—77 17 Claims



1. A method of heating and working a paved surface using a road maintenance machine comprising:

alternately applying heat to the paved surface at temperatures substantially above the burning temperature of said paved surface, and allowing said surface to partially cool to maintain the temperature of said surface below said burning temperature until said surface has been heated and softened to a predetermined depth;

said heat being generated by spaced apart rows of burner units carried by said road maintenance machine in a single pass over said paved surface, each adjacent pair of rows of burner units having a space between said rows sufficient for said cooling step;

confining the heat between said rows of burner units with a confining surface covering the space between each pair of adjacent rows of burner units, said heat being confined substantially between said confining surface and said paved surface; and

working said heated surface while in a softened state to a depth no more than said predetermined depth.

3,997,277

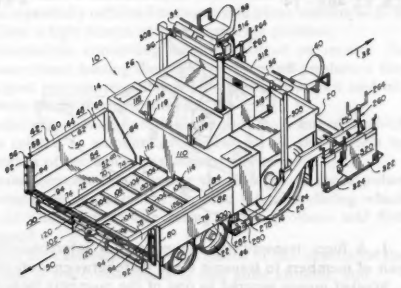
MATERIAL TRANSFER MECHANISM

George W. Swisher, Jr., Oklahoma City; Don W. Smith, Edmond, and Gary L. Westphall, Oklahoma City, all of Okla., assignors to CMI Corporation, Oklahoma City, Okla.

Filed June 13, 1975, Ser. No. 586,576

Int. Cl.[2] E01C 19/00

U.S. Cl. 404—84 32 Claims



19. An improved surface finishing machine for the continuous paving of a paved lane on a roadway with paving material, comprising:

a frame assembly;

drive means supporting the frame assembly for moving the frame assembly along the roadway in a driven direction;

hopper means supported on said frame assembly for receiving the paving material;

first transfer means between hopper means and first spreader means for transferring the paving material from the hopper means to the first spreader means;

first spreader means supported on the frame assembly for distributing the paving material transversely to the direction of travel of the surface finishing machine;

screed means pivotally attached to the frame assembly for compressing the paving means spread by the spreader means; and

a first feeder control assembly comprising:

a first hydraulic porting valve pivotably mounted on the frame assembly for pivotation in a first pivotal direction and in a second pivotal direction, the first hydraulic porting valve having a valve body and a controlling mechanism connected to the valve body and variably positionable relative thereto, the first hydraulic porting valve having a first output pressure mode and alternately, a second output pressure mode, responsively determined by the position of the controlling mechanism;

first biasing means biasing the first hydraulic porting valve to pivot in the first pivotal direction;

first sensor means contactingly engaging the paving material for detecting the paving material distributed by the first spreader means near one side of the paved lane and responsively moving the controlling mechanism of the first hydraulic porting valve to effectuate the first output pressure mode, and alternately, responsively moving the controlling mechanism of the first hydraulic porting valve to effectuate the second output pressure mode;

a first hydraulic power assembly having a swash plate control and a first hydraulic motor, the output speed of the first hydraulic motor being variable and responsive to the positional setting of the swash plate control;

a first hydraulic ram having an extendible connecting rod, the connecting rod attached to the swash plate control of the first hydraulic power assembly to selectively move the swash plate control upon extension or contraction of the connecting rod;

means connecting the first hydraulic ram and the first hydraulic porting valve for extending the connecting rod when the first hydraulic porting valve is in the first output pressure mode, and for contracting the connecting rod when the first hydraulic porting valve is in the second output pressure mode; and

a first feedback linkage means connecting the first hydraulic porting valve and the swash plate control lever for moving the first hydraulic porting valve in response to movement of the swash plate control lever of the first hydraulic motor.

3,997,278

VIBRATION TAMPER DEVICE

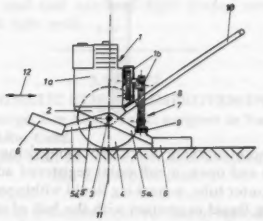
Franz Riedl, Munich, Germany, assignor to Wacker-Werke KG, Munich, Germany

Filed Mar. 2, 1976, Ser. No. 663,094

Claims priority, application Germany, Mar. 7, 1975, 2510063

Int. Cl.[2] E01C 19/34

U.S. Cl. 404—133 7 Claims



1. A tamping device comprising; a frame including spaced

ground engaging support elements and a horizontal shaft extending laterally therebetween, an engine and an output member supported by said engine and driven thereby, said output member having an eccentric thereon, said engine being tiltably supported on said shaft, a fore and aft rocker having a central portion tiltably engaging said shaft and having a tamping foot at each end, said tamping feet being engageable with the ground alternately as the rocker tilts on said shaft, and a drive member having one end connected to the eccentric on said output member and the other end operatively connected to said rocker at a point therealong spaced from said shaft.

3,997,279

DRILL BIT

L. Steven Porter, Shrewsbury, Mass., assignor to Parker Manufacturing Co., Worcester, Mass.

Filed Jan. 20, 1975, Ser. No. 542,457
Int. Cl.² B23B *51/00*
U.S. Cl. 408—211 **6 Claims**

1. A drill bit, comprising:
a. a shank defining an axis,
b. a spade cutter connected to the shank and having cutting edges extending generally radially of the said axis, and
c. a lead point extending from the spade cutter formed by two edges that intersect the said axis, the lead point being provided with concave faces extending symmetrically of the axis and from edge to edge throughout a substantial portion of the point, so that the intersection of the point by a plane that is at a right angle to the said axis gives a cross-sectional shape in the form of a 4-sided plane figure, two sides of the figure being straight parallel lines defined by the aforementioned two edges and the other two sides being concave curves of generally circular-segmental form, so that a cutting edge is provided with a positive rake.

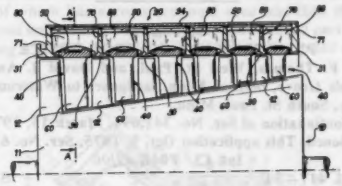
3,997,280

STATORS OF AXIAL TURBOMACHINES

Roger Louis Elysee Germain, Maisons Lafitte, France, assignor to Societe Nationale d'Etude et de Construction de Moteurs d'Aviation, Paris, France

Filed June 19, 1975, Ser. No. 588,141
Claims priority, application France, June 21, 1974, 74.22342
Int. Cl.² F01D *1/02*
U.S. Cl. 415—189 **8 Claims**

1. A monoblock stator casing for a multistage axial compressor in which stationary vanes are anchored to the stator casing by peripheral heels, said casing including a series of coaxial cylindrical annular sections which define annular spaces between said sections, heels of said stationary vanes being inserted and circumferentially guided in said spaces, said sections being rigidly fixed to ring-shaped peripheral webs, adjacent ones of said webs being secured to each other by radial longitudinal ribs, said heels of said vanes each having a peripheral end portion of substantially greater width than



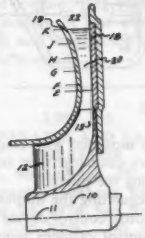
the corresponding one of said annular spaces and the edges of said end portions being abuttingly engaged by means comprising a centripetal-action clamping device against the ends of the sections which define said space and clearance openings for positioning and sliding of said heels within the annular spaces at the level of said ribs.

3,997,281

VANED DIFFUSER AND METHOD

Robert P. Atkinson, 7814 Knue Road, Indianapolis, Ind. 46250

Filed Jan. 22, 1975, Ser. No. 542,916
Int. Cl.² F04D *29/44*
U.S. Cl. 415—207 **2 Claims**



1. A centrifugal compressor having a group of diffusing flow passages bounded by two generally radial side walls and by a group of vanes having a generally tangential direction mounted between the two side walls thus defining the diffusing flow passages, each passage having an entrance at a diameter "E" and an exit at some larger diameter, each passage having a predetermined area at the entrance and a predetermined area at the exit greater than the area at the entrance, wherein the improvement comprises a progressive variation of passage area from entrance to exit according to a specified area schedule so as to control the diffusion rate to a value less than 0.07 and to cause a relatively constant change in the pressure rise ratio for each unit of flow path length; the said area schedule and diffusion rate being defined according to the formula,

$$\text{Diffusion Rate, } D_R = \frac{\text{Pressure Rise Ratio}}{\text{Diffuser Length Parameter}}$$

$$\text{where, Pressure Rise Ratio} = \frac{P_{sx} - P_{sE}}{P_{sE}},$$

$$\text{Diffuser Length Parameter is } \frac{L_x}{W_E},$$

P_{sx} is static pressure at any point x selected along the diffuser

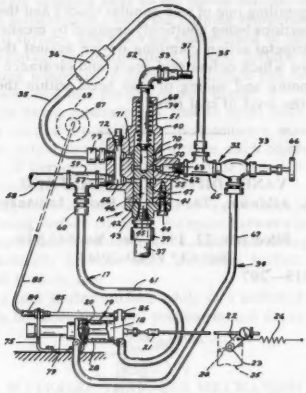
passage, P_{sE} is static pressure at the diffuser entrance at diameter E, L_x is diffuser path distance from the entrance at diameter E to the point x measured along the diffuser vane centerline, and W_E is diffuser passage width at the diffuser entrance at diameter E measured between the side walls perpendicularly to the flow path.

3,997,282

PUMP PRESSURE CONTROL DEVICE

David F. Thomas, West St. Paul, and David J. Anderson, Maple Grove, both of Minn., assignors to Waterous Company, South St. Paul, Minn.

Continuation of Ser. No. 341,694, March 15, 1973, abandoned. This application Oct. 9, 1975, Ser. No. 621,246
Int. Cl.[2] F04B *49/00*
U.S. Cl. 417—34 5 Claims



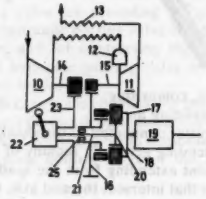
1. In combination,
a. a main frame;
b. a pump fixedly mounted with respect to the frame and having a delivery discharge port and an intake port;
c. means for driving the pump;
d. a throttle for regulating the output of the pump;
e. a hydraulic throttle control device including:
1. a throttle control cylinder mounted for longitudinal movement with respect to said main frame, and having a first end closure plate closing a first end and a second end closure plate closing a second end of said cylinder;
2. a throttle control piston operably mounted in said cylinder and dividing the cylinder into a first end chamber adjacent the first end closure plate and a second end chamber adjacent the second end closure plate;
3. resilient means urging said piston in direction away from said first end and toward said second end of said cylinder; and
4. a piston rod integral with said piston and extending outwardly of said cylinder through at least one end closure plate;
f. an operational link between said piston rod and said throttle connected to decrease the output of said pump as said piston and piston rod move in direction toward said first end of said throttle control cylinder and to increase the output of said pump as said piston and rod move in direction toward said second end of the cylinder;
g. an accumulator;
h. means for charging gas into an upper portion of said accumulator;
i. means operable to define a first passageway from a lower portion of said accumulator into said first end chamber;
j. means operable to define a second passageway from said pump delivery port into said second end chamber; and
k. independent means to selectively move said throttle control cylinder longitudinally to position it at any one of a plurality of positions with respect to said base;
1. said means operable to define said first and second passageways including:
1. a directional control valve having a valve element therein movable between first and second positions;
2. said directional control valve, when said valve element is in said second position, defining parts of said first and second passageways;
3. said directional control valve, when said valve element is in said first position, establishing a third passageway from a lower part of said accumulator into said second end chamber and establishing a fourth passageway from said delivery port into said first end chamber;
4. means normally biasing said valve element toward said first position; and
5. means responsive to the pump delivery pressure in said delivery port to move and hold said valve element to and in said second position when said pressure is above a predetermined minimum.

3,997,283

AUTOMOTIVE GAS TURBINE POWER PLANT

Sven-Olof Kronogård, Lomma, Sweden, assignor to United Turbine AB & Co., Kommanditbolag, Malmo, Sweden

Filed Sept. 30, 1974, Ser. No. 510,769
Int. Cl.[2] F04B *35/00*
U.S. Cl. 417—405 2 Claims



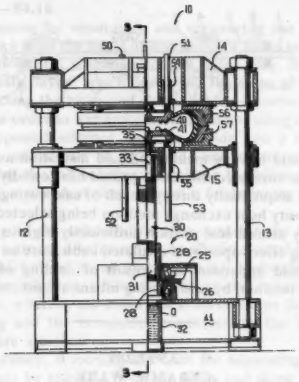
1. In an automotive gas turbine power plant for a vehicle provided with wheels, including a turbine having a rotor, a first shaft, the turbine rotor being mounted on the first shaft, a compressor having a rotor, a second shaft separate from the first shaft, the compressor rotor being mounted on the second shaft, and transmission means interconnecting the first and second shafts adapted to transmit the power required for driving the compressor as well as to a power transfer shaft operably connected to the wheels of the vehicle, the improvement of a first reduction gear of the planetary type in the transmission means, said planetary gear having one input means and first and second independent output means, an infinitely variable transmission member connected to the first output means of the planetary gear for transferring power to the second shaft mounting the compressor in response to the occasional load upon the plant, and a second reduction gear including a reversing step connected to the second output means of said planetary gear for transferring power to the power transfer shaft, the first and second shafts being aligned in a horizontal direction, and the planetary gear is of the differential type having stepped planetary gear wheels, the input means including one sun wheel, the first output means including a second sun wheel, and said input means and first output means including concentric components.

3,997,284

AUTOMATIC PRODUCTION MOLDS

Kenneth T. MacMillan, Macon, Ga., assignor to MacMillan Mold Company, Inc., Macon, Ga.

Filed Aug. 27, 1973, Ser. No. 391,816
Int. Cl.² B29H *5/04, 5/18*
U.S. Cl. 425—23 13 Claims



1. A retreading mold comprising a pair of relatively movable platens, means for supporting said platens during relative movement therebetween, means for imparting relative motion to said platens between spaced opened and closed positions, a bead aligner wheel carried by each platen, a bladder disposed between said bead aligner wheels, each of said bead aligner wheels including means for hermetically sealing against the exterior surface of said bladder, said sealing means being a continuous uninterrupted rib carried by each bead aligner wheel, each bead aligner wheel having a surface radially outboard of its associated sealing rib, each surface having a plurality of groove means thereabout for venting air to atmosphere from between an exterior of said bladder and said wheel aligners, said bladder includes a pair of innermost edges, each of said edges being in further hermetic sealing contact with its associated bead aligner wheel at a point radially inboard of its sealing rib whereby an annular portion of each bead aligner wheel is spanned by a portion of said bladder between its one edge and its sealing rib and forms therewith a hermetically sealed annular chamber, and means for inflating said bladder to place each annular chamber under a partial vacuum to effect a tight hermetic seal between said bladder and said uninterrupted ribs.

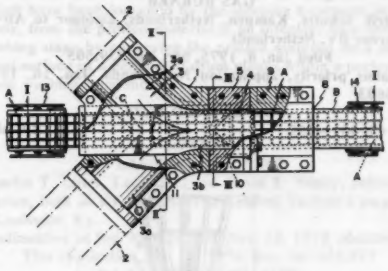
3,997,285

APPARATUS FOR MOLDING AN EXTRUDED PRODUCT CONTAINING A REINFORCING MATERIAL

Hachiro Miyazaki, Ko-450, Oaza-Kuma, Shiota, Fujitsu, Saga, Japan

Filed Feb. 18, 1975, Ser. No. 550,508
Claims priority, application Japan, Feb. 20, 1974, 49-20226; Aug. 15, 1974, 49-93867; Oct. 2, 1974, 49-114088; Oct. 3, 1974, 49-114508
Int. Cl.² B29F *3/10*
U.S. Cl. 425—113 7 Claims

1. Apparatus for molding an extruded product containing a reinforcing material comprising an injection pipe means having a generally Y-shaped configuration which includes two leg portions joined to a juncture portion, an extruding means joined to each of said leg portions for feeding extruded material to each of said leg portions, said extruded material flowing from said two leg portions to combine in said juncture portion, said juncture portion having an outlet, a guide conduit for feeding reinforcing material, said guide conduit extending into and having an axis generally coincident with the axis of said juncture portion of said injection pipe means, said juncture portion comprising a flow regulating means having an internal passage through which said extruded material flows and through which said guide conduit passes, said flow regulating means internal passage having an inlet portion and an outlet portion, said inlet portion having at least a reduced part thereof which has a cross sectional area less than the cross sectional area of said outlet portion, said reduced part thereby defining a throttle for throttling the flow of extruded material



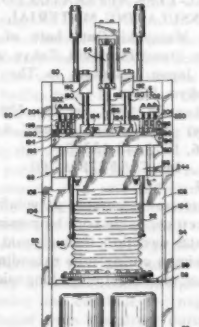
into said outlet portion, and extruding die means disposed at said outlet of said juncture portion, said die means having an internal passage having an inlet, said guide conduit having a longitudinal end terminating substantially at said inlet of said internal passage of said die means such that said reinforcing material passes from said guide conduit into said internal passage of said die means, said internal passage of said die means receiving said confined flow of said extruded material from said juncture section of said injection pipe means to thereby flow around said reinforcing material as the latter exits from such guide conduit.

3,997,286

MOLDING APPARATUS AND VACUUM SYSTEM THEREFOR

Kenneth F. Gabrys, Streamwood, Ill., assignor to Chicago Rawhide Manufacturing Company, Elgin, Ill.

Filed Mar. 15, 1976, Ser. No. 667,082
Int. Cl.² B29H *9/10;* B29G *1/00, 3/00;* B29D *3/00*
U.S. Cl. 425—405 R 18 Claims



18. A press having a frame, a ram and a cross head, a vac-

uum box affixed to the frame at one end of said vacuum box, a top platen adapted to swing between an upper position at which said platen is parallel with and tangent to said cross head and a lowered position, and means mounting said top platen for pivotal movement with respect to said vacuum box, said mounting means being affixed to the other end of said vacuum box and being arranged for adjustable positioning with respect to said cross head.

3,997,287

GAS BURNER

Hendrik Schutte, Kampen, Netherlands, assignor to Air-O-Burner BV, Netherlands

Filed Jan. 8, 1975, Ser. No. 539,505

Claims priority, application Netherlands, Jan. 16, 1974, 7400603

Int. Cl.² F23D *13/36*

U.S. Cl. 431—355 3 Claims

1. A gas burner comprising an injection piece having a gas inlet and apertures through which primary air can enter and an out flow part of sheet material folded into a star-shaped configuration by which means a number of annularly arranged substantially radially directed slits are formed defining a ring wherein the height of the star shape folds is a multiple of the radial dimension of said folds, the cross sectional area of each slit being larger near the circumference of said ring than in the center, and each slit having a narrow zone transverse to the direction of flow spaced from the outflow opening.

3,997,288

HORIZONTAL-TYPE APPARATUS FOR CURING INSULATING MATERIAL

Michio Takaoka; Motoyuki Ono, both of Tokyo; Hiroto Oshima, Suzuka; Masaichiro Seki, Tokyo, and Hideo Sano, Suzuka, all of Japan, assignors to The Fujikura Cable Works, Ltd., Tokyo, Japan

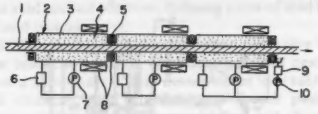
Filed Aug. 26, 1974, Ser. No. 500,682

Claims priority, application Japan, Aug. 30, 1973, 48-97726; Nov. 26, 1973, 48-133304

Int. Cl.² F27B *15/00*

U.S. Cl. 432—197 8 Claims

1. Apparatus for curing curable polyolefin-insulation applied about an electrical cable core by passing said insulated core in a horizontal direction through said apparatus, said apparatus comprising a curing tube extending in a generally horizontal direction, means defining along said tube a plurality of curing units, each of said units being defined to include a heating zone, a cooling zone and a seal portion arranged in series, heating means located at said heating zone, cooling means located proximate said cooling zone and said seal portion, and a high-viscosity heat exchange medium provided within said curing tube to enable curing of said polyolefin-insulation at said heating zone by heat transfer therethrough



between said heating means and said insulation as said insulated cable core is continuously passed horizontally along said apparatus sequentially through each of said curing units, said high viscosity heat exchange medium being selected to exhibit a viscosity at said seal portion sufficiently high to produce a supporting effect upon said insulated cable core as it is passed through said apparatus as a result of cooling of said heat exchange medium by said cooling means at said cooling zone.

3,997,289

CERAMIC WARE

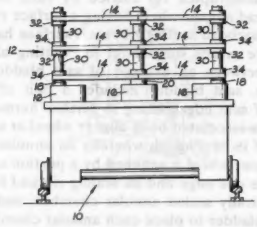
Edward Carryer Bowers, Newcastle, England, assignor to Staffordshire Potteries (Holdings) Limited, Stoke-on-Trent, England

Filed June 19, 1975, Ser. No. 588,318

Claims priority, application United Kingdom, June 25, 1974, 28065/74

Int. Cl.² F27D *3/12, 5/00*

U.S. Cl. 432—241 5 Claims



1. A kiln car comprising a wheeled base having a substantially flat horizontal upper surface and carrying a superstructure comprising a plurality of superimposed rectangular tiers each composed of at least one plate-like batt of refractory material, the tiers being vertically spaced from one another and from said base by supporting props of refractory material located at least at the four corners of the tiers, each each prop having substantially flat top and bottom surfaces, wherein the improvement comprises at least one disc of refractory material interposed between the lowermost tier and each of its supporting props, both the under side of said tier and the top of each of its supporting props having a substantially flat surface in contact with said interposed discs, and at least some of said discs having one convex side making substantially point contact with an opposing surface, and one substantially flat side.

3,997,290

PROCESS TO SEPARATE AND RECOVER THE SOLID AND LIQUID PHASES FROM TREATMENT BATHS OF HIDES AND SKINS

Eusebio del Cueto, Grieta No. 165, Mexico City 20, Mexico

Filed Apr. 21, 1975, Ser. No. 569,642
Claims priority, application Mexico, May 6, 1974, 151060
Int. Cl.[2] C14C *1/06, 1/08*
U.S. Cl. 8—94.16 9 Claims

1. A process for separating and recovering the solid and liquid phases from the baths of treatment of hides and skins in any conditions, i.e. with hair, crude salted, dry, flint-dry or fresh recently flayed, which comprises the steps of:

a. contacting the hides and skins with an aqueous salt solution, in order to wet and condition them, using as the salt, a compound selected from an halide and a metal sulphate, anhydrous or hydrated, and mixtures thereof, agitating the salt solution containing the hides and skins, during a period of time of from a few minutes to several days;

b. adding to the salt solution that contains the hides and skins, a strong alkali such as an alkaline metal hydroxide or a mixture of an alkali-earth metal hydroxide and an alkaline sulphide, while maintaining the agitation in the system, whereby the hides and skins continue their conditioning and the components adhered to the hides and skins are attacked;

c. if necessary, screening the bath for separating the hair that may be released from the hides and skins;

d. separating from the treatment bath, the hides and skins once the conditioning thereof has ended;

e. treating the bath while agitating, with a strong acid or with an acid salt, for lowering the pH until a value of 2 to 5, whereby a precipitation of the solid phase released from the hides and skins occurs;

f. separating the solid precipitated phase from the liquid phase;

g. treating the liquid phase with a strong alkali such as an alkali metal hydroxide or with a mixture of an alkalit metal hydroxide and an alkaline sulphide to raise the pH to a value of 6 to 14, whilst a temperature of 0° C. to 50° C. is maintained, and

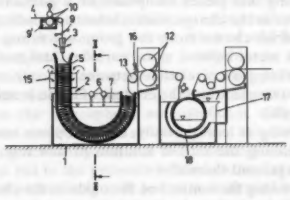
h. utilizing the liquid phase adjusted according to g), for the conditioning of the hides and skins for their further treatment at a pH of from 6 to 14.

3,997,291

PROCESS FOR THE WET TREATMENT OF LENGTHS OF PRINTED TEXTILE MATERIAL IN SEVERAL TREATMENT BOWLS

Heinz Fleissner, Egelsbach near Frankfurt am Main, Germany, assignor to Vepa AG, Switzerland

Division of Ser. No. 291,064, Sept. 21, 1972, abandoned. This application Nov. 19, 1973, Ser. No. 416,876
Claims priority, application Germany, Sept. 21, 1971, 2146990; Nov. 16, 1971, 2156765; Feb. 14, 1972, 2206872; Feb. 21, 1972, 2208053; Mar. 24, 1972, 2214267; May 5, 1972, 2222125
Int. Cl.[2] D06B *3/24, 5/08;* D06L *1/08*
U.S. Cl. 8—137 13 Claims



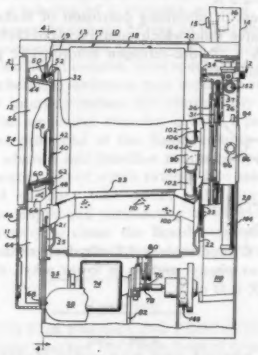
1. A process for the washing of printed textile materials comprising woven or knitted fabrics of natural and/or synthetic fibers which comprises wetting a printed material with a treatment liquor; allowing the wetted printed material to dwell in a steeping bowl containing a treatment liquor for several minutes in a folded state, said steeping bowl comprising a J-box having a knee portion located in a bowl containing said treatment liquor up to a certain liquid level, an intake leg portion and a delivery leg portion, and said printed material being pushed slowly through the knee portion of said J-box in said folded state and out above the liquid level in the delivery leg portion whereby tension-free delivery of the printed material from the J-box is obtained, and removing substances, which have been loosened by the steeping treatment in said J-box, from the printed material in an intensive flow-through washing stage by conveying the printed material on a perforated surface of a perforated drum means within a perforated drum washing bowl means.

3,997,292

LAUNDRY MACHINE

Charles T. Lutes, Louisville, and David E. Netter, Jeffersontown, both of Ky., assignors to General Electric Company, Louisville, Ky.

Continuation of Ser. No. 524,767, Nov. 18, 1974, abandoned. This application Jan. 19, 1976, Ser. No. 650,557
Int. Cl.[2] D06F *21/04, 37/00*
U.S. Cl. 8—158 19 Claims



1. A laundry machine having both a wash and extraction operation including:

a. a rotatable horizontal axis drum for tumbling clothes therein, said drum having only two active baffles and two inactive baffles secured to the interior of the drum, said two active baffles being located on opposite sides of the interior of the drum between 170° and 190° apart,

b. means for continuously introducing fresh liquid into the drum during the wash operation,

c. means for producing through said two active baffles a negative pressure at a rate sufficient to continuously withdraw the liquid from the interior of the drum to prevent a bath type washing action,

d. means to continuously discharge the withdrawn liquid from the interior of the drum outside the machine, and

e. means to stop the introduction of liquid at the end of the wash operation and continue the negative pressure to withdraw liquid from the drum during the extraction operation and discharge it outside the machine.

12. A method of washing clothes by performing both a wash and a subsequent extraction operation in a machine having a rotatable horizontal axis cylindrical drum and a negative pressure producing means comprising the following steps:

a. tumbling the clothes by rotating the drum, said tumbling being aided by two active baffles and two inactive baffles secured to the interior of the drum, said two active baffles being located on opposite sides of the interior of the drum between 170° and 190° apart,
b. introducing fresh liquid into the drum continuously during the wash operation,
c. producing through said two active baffles a negative pressure sufficient to continuously withdraw the liquid from the interior of the drum to prevent a bath type washing action,
d. discharging the liquid continuously from the interior of the drum outside the machine, and
e. stopping the introduction of liquid at the end of the washing operation while continuing the negative pressure to withdraw liquid from the drum during the extraction operation and discharge it outside the machine.

3,997,293

USE OF DIHYDRO-NITROGEN HETEROCYCLIC PHOSPHORAMIDATES AS CORROSION INHIBITORS

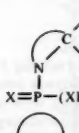
Derek Redmore, Ballwin, Mo., assignor to Petrolite Corporation, St. Louis, Mo.

Division of Ser. No. 453,013, March 19, 1974, Pat. No. 3,923,490, which is a division of Ser. No. 210,106, Dec. 20, 1971, Pat. No. 3,821,232. This application Aug. 7, 1975, Ser. No. 602,634

Int. Cl.² C23F *11/00*, *11/04*, *11/10*; C23G *1/06*

U.S. Cl. 21—2.5 A **12 Claims**

1. A process of inhibiting corrosion of metals in contact with a corrosive fluid which comprises contacting the metal surfaces with a dihydro-nitrogen heterocyclic phosphoramidate of the formula



where N — C represents a 1,2-dihydropyridine group, R is lower alkyl or phenyl and R_1 is lower alkyl, cyclohexyl, or phenyl and X is O or S.

3,997,294

DEVICE FOR TREATING GASES

Gerhard Kritzler, Freudenberg, Germany, assignor to Apparatebau Rothemuhle Brandt & Kritzler, Rothemuhle, Germany

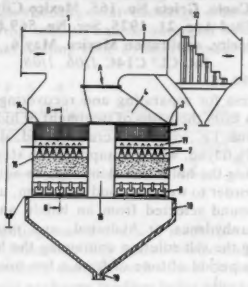
Filed Nov. 11, 1974, Ser. No. 522,696

Claims priority, application Germany, Nov. 24, 1973, 2358678

Int. Cl.² F23G *7/06*

U.S. Cl. 23—277 C **12 Claims**

1. Gas treatment apparatus comprising an inlet duct leading to one axial end face of a stationary regenerative heat-exchange mass of a rotary regenerative preheater wherein said mass comprises a first gas treatment means, an outlet duct for receiving gas from said one axial end face of the heat-exchange mass of the rotary regenerative preheater, and means for causing rotation of at least one of the inlet and outlet ducts about the axis of the heat-exchange mass; further gas treatment means provided beyond the other axial end face of the heat-exchange mass, the regenerative mass being divided into a plurality of sectors by dividing walls; and a sealing surface between the regenerative structure and the at least one rotatable duct provided by a metal element at the said one axial end face and borne by a support structure, the support structure supporting the regenerative heat-exchange mass and including the said dividing walls and being stationary; wherein at least the exposed surface of the remainder of the height of the dividing walls is provided by a material selected for resistance to the conditions to be encountered; and wherein there is further provided a plenum chamber into which all the said sectors open in common so that gas may pass from the inlet



duct through the heat-exchange mass into the plenum chamber and return through the mass to the outlet duct and a further treatment may be performed by said further gas treatment means on the gas between its passes through the heat-exchange mass.

3,997,295

PROCESS FOR THE DETERMINATION OF THE OXIDE CONTENT OF A MOLTEN SALT CHARGE

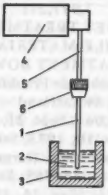
Rudolf Keller, Ossingen, and Olaf Frei, Dachsen, both of Switzerland, assignors to Swiss Aluminium Ltd., Chippis, Switzerland

Filed Nov. 8, 1974, Ser. No. 521,957

Claims priority, application Switzerland, Nov. 13, 1973, 15912/73

Int. Cl.² G01N *33/20*

U.S. Cl. 23—230 C **14 Claims**



1. A method for determining the oxide content of a molten salt charge comprising the steps of

providing test pieces composed of a substance which dissolves in the charge, said substance including at least one material chosen from the group consisting of metal oxides, metal halides, metal carbides, and metal nitrides;

determining a correlation between the rate of solution of said test piece and the content of oxide in said molten salt sample;

immersing at least partially, said test piece into the charge;

determining the rate of solution of said test piece in said charge; and thereafter

determining the content of the oxide in the charge from the rate of solution of said test piece by means of the determined correlation.

3,997,296

PRIMARY STANDARDS

Warren V. Miller, Newton, N.J., assignor to Spex Industries Inc.

Filed Feb. 6, 1975, Ser. No. 547,605
Int. Cl.² G01N 1/00
U.S. Cl. 23—232 R 15 Claims

1. A method for the provision of a primary standard which method comprises:

placing into a container of known volume a known amount of a material from which a gas may be released in a known amount by heating;

sealing said container;

effecting the dissociation of said gas from said material in said container by heating said material to its dissociation temperture; and

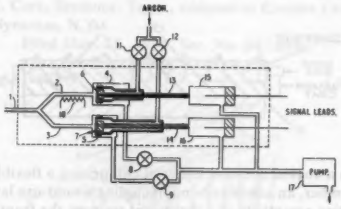
withdrawing from said container a known amount of said gas for use in calibrating a detector.

3,997,297

METHOD AND APPARATUS FOR DETECTING A CONSTITUENT IN AN ATMOSPHERE

Anthony Jenkins, 54 Finchams Close, Linton, Cambridgeshire, and Douglas Walter Isgrove, 144 Malvern Road, Cherryhinton, Cambridgeshire, both of England

Filed Mar. 27, 1975, Ser. No. 562,681
Int. Cl.² G01N 27/30, 27/64, 33/22
U.S. Cl. 23—232 E 12 Claims



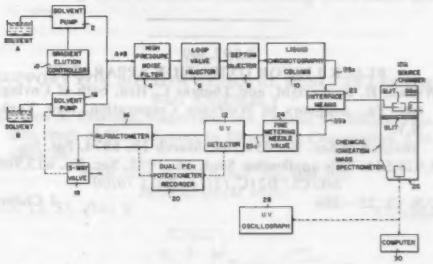
1. A method of detecting the presence of a particular constituent in an atmosphere which comprises drawing a sample of the atmosphere along two substantially identical flow paths, each path containing a respective detector capable of detecting said particular constituent, and converting said particular constituent content in one but not the other of said flow paths into matter incapable of producing a response in the associated detector, and passing the flows in said paths to the respective detectors, whereby in the absence of said particular constituent in the atmosphere no significant difference is detectable between the signals emitted by the two detectors as the flows along the two paths into the detectors are substantially identical but in the presence of said particular constituent the flow content along said one path is altered to change the signal from the associated detector and the resultant difference in signals from the two detectors is indicative of the presence of the particular constituent in the sampled atmosphere.

3,997,298

LIQUID CHROMATOGRAPHY-MASS SPECTROMETRY SYSTEM AND METHOD

Fred W. McLafferty, Ithaca, N.Y., and Michael A. Baldwin, Carshalton Beeches, England, assignors to Cornell Research Foundation, Inc., Ithaca, N.Y.

Filed Feb. 27, 1975, Ser. No. 553,519
Int. Cl.² G01N 31/08
U.S. Cl. 23—253 R 5 Claims



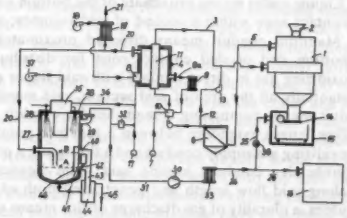
1. In a liquid chromatography-mass spectrometer apparatus for analyzing a solution of a complex mixture, including a liquid chromatography column having an input and an output, pump means connected with said inlet for pumping the solution through said liquid column, mass spectrometer measuring means of the chemical ionization type including an ion source chamber, and interface means for continuously introducing directly into the ion source chamber at least a portion of the eluted effluent produced at the liquid column output; the improvement wherein said interface means comprises a capillary tube the outlet end of which extends into said ion source chamber, said capillary tube outlet end being cylindrical throughout its length and terminating at its extremity in a restriction, thereby to cause the liquid supplied to the ion source chamber to have a relatively low flow rate.

3,997,299

APPARATUS FOR PRODUCING PROTECTIVE GAS

Robert von Linde; Joachim von Linde, both of Graefelfing, and German Kurz, Karlsfeld, all of Germany, assignors to Caloric Gesellschaft fur Apparatebau m.b.H., Graefelfing, Germany

Filed Apr. 11, 1975, Ser. No. 567,245
Claims priority, application Germany, Jan. 23, 1975, 2502674
Int. Cl.² B01J 7/00; F27D 17/00
U.S. Cl. 23—281 3 Claims



1. Apparatus for producing protective gas in combination with equipment for carrying out ore reduction processes, comprising; a protective gas generator having a chamber, a

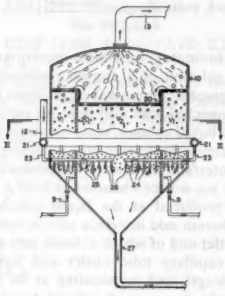
burner mounted upon said chamber and having a combustion chamber projecting from above into said chamber, means for injecting cooling water into the hot waste gases within said chamber, said means being arranged above the lower end of said combustion chamber, a discharge pipe for the cooled waste gases extending from said chamber above the lower end of said combustion chamber, a liquid outlet for the heated cooling water in the lower part of said chamber, and further comprising a main burner, a main pipe carrying waste gases from said main burner to said chamber and extending substantially vertically downwardly within said chamber and opening in the lower part thereof and below said liquid outlet, a second liquid outlet below the opening of said main pipe and a shut-off device associated with said second liquid outlet.

3,997,300

BLACK LIQUOR OXIDATION APPARATUS

William H. Boatwright, and Thomas C. Hsu, both of Covington, Va., assignors to Westvaco Corporation, New York, N.Y.

Division of Ser. No. 451,764, March 18, 1974, Pat. No. 3,928,531. This application Sept. 16, 1975, Ser. No. 613,908
Int. Cl.² D21C *11/14*; B01J *10/00*
U.S. Cl. 23—284 4 Claims



1. An apparatus for intimately contacting a flowing quantity of spent cellulose pulping liquor with a quantity of oxidizing gas, said apparatus comprising:

A. A vessel of substantially uniform sectional area from a bottom end to a top end along the height of a contact zone;

B. Partition means extending from the bottom end of said vessel for a portion of the height thereof and dividing the area of said section into at least two volumes, said two volumes communicating only above the top of said partition;

C. Liquor inlet means proximate of the bottom end of said contact zone within a first of said volumes;

D. Liquor outlet means proximate of the bottom end of said contact zone within a second of said volumes; and,

E. Manifold conduit means disposed proximately of the bottom end of said contact zone for distributing said oxidizing gas in direct contact with said liquor over substantially all the area of said section, said manifold conduit means comprising a main header conduit having a flow length extending between a juncture point with an oxidizing gas supply conduit and a flow plug, a plurality of subheader conduits joining said main header serially along said flow length and penetrating both of said volumes, a plurality of gas discharge orifice means respective to each of said subheaders, joined thereto and positioned over the sectional area of both volumes to distribute substantially uniformly the discharge of oxidizing gas over said sectional areas, the mathematical ratio of areas between the total of all subheader flow sections and the main header flow section being approximately 0.95 or less when the ratio of said flow length to the effective flow diameter of said main header is approximately 70 or less.

3,997,301

TIN-ELECTROPLATED STEEL SHEETS AND METHOD FOR MAKING THEM

Takahisa Yoshihara, and Hajime Kimura, both of Chiba, Japan, assignors to Kawasaki Steel Corporation, Kobe, Japan

Filed Feb. 11, 1976, Ser. No. 657,071
Claims priority, application Japan, Feb. 13, 1975, 50-17397
Int. Cl.² B23P *3/00*; C25D *5/10*, *5/48*, *5/50*
U.S. Cl. 29—183.5 16 Claims

1. A tin-electroplated steel sheet having an excellent sulfur resisting property and excellent smudge resisting property, comprising a cold rolled low carbon steel sheet substrate, a layer consisting of 1 to 15 g/m² of electroplated tin, said layer being electroplated upon at least one side surface of said substrate and a layer consisting of 0.0071 to 0.71 g/m² of zinc, said layer being plated upon said tin layer.

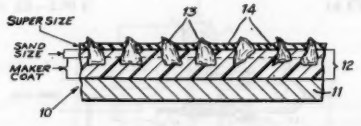
5. A method of manufacturing a tin-electroplated steel sheet having an excellent sulfur resisting property and excellent smudge resisting property, comprising the steps of electroplating at least one side surface of a cold rolled low carbon steel sheet substrate with 1 to 15 g/m² of tin to provide a tin coating, and plating said tin coating with 0.0071 to 0.71 g/m² of zinc to provide a zinc coating superimposed upon said tin coating.

3,997,302

COATED ABRASIVE PRODUCTS HAVING A SUPERSIZE LAYER OF A CONJUGATED DIOLEFIN POLYMER

Stanley J. Supkis, Averill Park, N.Y., assignor to Norton Company, Worcester, Mass.

Continuation-in-part of Ser. No. 141,666, May 10, 1971, abandoned, which is a continuation-in-part of Ser. No. 47,786, June 19, 1970, abandoned. This application May 27, 1975, Ser. No. 580,671
Int. Cl.² B24D *11/00*
U.S. Cl. 51—295 4 Claims



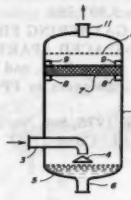
1. In a coated abrasive material comprising a flexible backing member, an adhesive bond, including a sand size layer, and consisting essentially of a thermoset resin on the front surface of said backing member, abrasive grains firmly affixed by the adhesive bond to the backing member, and a supersize layer on the surface of said coated abrasive comprising an adhesive securing a particulate grinding aid on the working surface of the abrasive, the improvement which comprises the use in said supersize layer of an adhesive consisting essentially of an elastomeric material selected from the group consisting of polymers of conjugated diolefins and copolymers of conjugated diolefins with at least one other monomer copolymerizable therewith, said other monomer being less than about 50% by weight of the total weight of the copolymer, said elastomeric material having substantial residual unsaturation, in terms of the weight percent of $c = c$ functional groups, and being active in increasing the cutting ability of the coated abrasive material and being further characterized by having good adhesion to the adhesive bond for the abrasive at the temperatures obtained during use of the abrasive materials.

3,997,303

LIQUID-GAS PHASE SEPARATOR HAVING A PERFORATED PLATE AND MIST ELIMINATOR PAD

Charles L. Newton, Bethlehem, Pa., assignor to Air Products and Chemicals, Inc., Allentown, Pa.

Filed May 1, 1975, Ser. No. 573,645
Int. Cl.² B01D 46/00
U.S. Cl. 55—97 3 Claims



3. In a process for removing entrained liquid droplets from a gas stream by passing the gas stream through a mist eliminator pad in a liquid-gas phase separator for effecting condensation of the droplets, and permitting droplets to fall from the mist eliminator pad countercurrent to the gas stream to the liquid outlet, and discharging the dry gas to a gas outlet, the improvement for causing the gas stream to approach the mist eliminator pad at substantially uniform velocity across the surface of the pad which comprises:

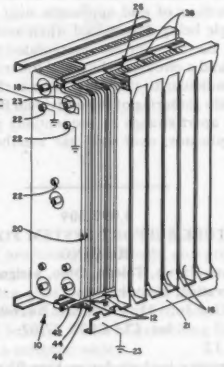
effecting a pressure drop in the gas stream of from 55 to 75% of the total pressure drop of the gas stream in the phase separator through a surface aligned with the mist eliminator pad substantially transverse to the direction of flow of the gas stream, the surface having a plurality of perforations of from about ⅛ to ¾ inch in size and substantially uniformly distributed therein for effecting distribution of the gas stream across the surface, this pressure drop being effected at a point between the mist eliminator pad and gas outlet, and being the only substantial pressure drop exclusive of the mist eliminator pad.

3,997,304

MOUNTING SYSTEM OF IONIZING WIRES OF ELECTROSTATIC PRECIPITATOR

Allan W. Carr, Seymour, Tenn., assignor to Carrier Corporation, Syracuse, N.Y.

Filed Mar. 28, 1975, Ser. No. 563,016
Int. Cl.² B03C 3/04
U.S. Cl. 55—147 4 Claims



1. A mounting system for ionizing wires of electrostatic precipitation apparatus comprising:

a source of relatively large magnitude electrical voltage;

conductive bus bar means with a plurality of slots formed along the axial length thereof connected to said source of voltage;

a plurality of ionizing wires spaced axially along the length of said bus bar means and extending transversely thereto; and

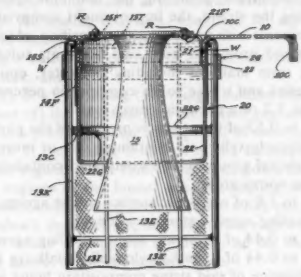
resilient electrically conductive spring means including a body portion and a pair of spaced apart resilient legs extending outwardly from said body portion and terminating in generally ring-like portions having the ends of a pair of adjacent ionizing wires secured therein and said body portions being disposed in said slots formed in said bus bar means and secured to the ends of each of said ionizing wires to maintain said ionizing wires under tension.

3,997,305

SUPPORT FOR BOTTOM REMOVAL DUST COLLECTOR BAG ASSEMBLY

Edward A. Ulvestad, Naperville, and Charles M. Harris, Palatine, both of Ill., assignors to Flex-Kleen Corporation, Chicago, Ill.

Filed Mar. 5, 1976, Ser. No. 664,192
Int. Cl.² B01D 46/02
U.S. Cl. 55—341 R 3 Claims



1. In a reverse blow-back dust collector that includes a tube sheet having a plurality of depending integral collar portions each defining a mounting opening and a separate bag assembly for each mounting opening, each bag assembly including an elongated skeletal cage, an elongated bag having an open end-sleeve portion to receive the cage therein, and an air nozzle to fit within one end of the cage, an improved bag, cage and nozzle mounting and support arrangement wherein said cage includes a 360° (+) split ring having overlapping ends at the top thereof and disposed within a top fold of the end-sleeve portion for biasing the top fold inwardly into sealing contact with the integral collar and a C-shaped intermediate ring, having a gap in general alignment with the overlapping ends, permanent hollow bottom support structure for attachment both to the cage and to the nozzle and including stepped diameter structure defining a reduced upper end portion and a main body portion, said upper end portion projecting in force-fit relation into the integral tube sheet collar portion said nozzle is attached to said support structure and said main body portion being generally aligned with the collar and having a horizontal exterior locking groove, and said C-shaped intermediate ring is positioned adjacent said groove, securing means for fixing the upper end portion directly to the integral collar to transmit support structure loads into the tube sheet collar, and clamping means detachably encircling the bag and cage between said top and intermediate rings to collapse said cage into mounted position wherein said top ring establishes a 360° (+) seal between the top fold and the tube sheet collar and said intermediate ring enters the groove in interlocking relation to transmit cage loads to the integral collar through the support structure.

3,997,306

GLASS FIBER SIZING COMPOSITION FOR THE REINFORCEMENT OF RESIN MATRICES AND METHOD OF USING SAME

Jerry C. Hedden, Shelby, N.C., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed Mar. 31, 1975, Ser. No. 565,986
Int. Cl.² C03C 25/02
U.S. Cl. 65—3 C 17 Claims

1. An aqueous glass fiber sizing composition suitable for sizing glass fibers for use as reinforcement for resin matrices including polyester, epoxy and vinyl ester resins comprising in percent by weight

1.9 to 3.2 of a phenolic epoxy resin,

0.31 to 0.53 of the reaction product of a partial ester of a polycarboxylic acid containing one or more unesterified carboxyl groups with a compound containing more than one epoxy group,

0.58 to 1.0 of non-ionic surface active agents,

a coupling system including

0.14 to 0.44 of an amino silane coupling agent and 0.14 to 0.44 of a methacryloxyalkyltrialkoxy silane, and

the balance of said sizing composition being water.

9. In the method of forming glass fiber strand comprising drawing glass filaments from molten cones of glass in a bushing, applying aqueous sizing composition to said filaments during formation, gathering the filaments into strand, and collecting the strand, the improvement comprising sizing the said filaments with an aqueous composition which renders the glass strand produced from said filaments suitable for reinforcing resin matrices including polyester, epoxy and vinyl ester resins and whose solids comprise in percent by weight

1.9 to 3.2 of a phenolic epoxy resin,

0.31 to 0.53 of the reaction product of the partial ester of a polycarboxylic acid containing one or more unesterified carboxyl groups with a compound containing more than one epoxy group,

0.58 to 1.0 of non-ionic surface active agents,

a coupling agent system including

0.14 to 0.44 of an amino silane coupling agent,

0.14 to 0.44 of a methacryloxyalkyltrialkoxy silane, and

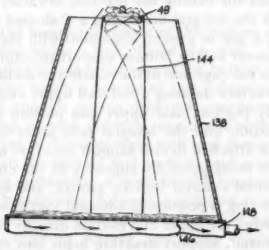
the balance of said sizing composition being water.

3,997,307

METHOD AND APPARATUS FOR MAKING GLASS FIBERS UTILIZING AN OSCILLATING SPINNER

Duane Harold Faulkner, Cambridge City; Steven Douglas Sanford, and Herbert Meredith Stanley, both of Richmond, all of Ind., assignors to Johns-Manville Corporation, Denver, Colo.

Filed July 28, 1975, Ser. No. 599,614
Int. Cl.² C03B 37/04
U.S. Cl. 65—6 23 Claims



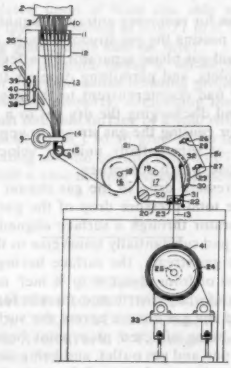
1. In a method of making a fibrous mat comprising feeding a molten material to a rotor, rotating the rotor at a high speed to form fibers, stripping the fibers from the exterior of the rotor to form a column of loose fibers, and moving said column back and forth across the width of a collection surface, the width of said collection surface being substantially greater than the width of said column of loose fibers; the improvement comprising: moving said column of fibers by moving the rotor such that the rotor's axis of rotation is moved such that said column of fibers is swept back and forth to form said fibrous mat across the width of said collection surface.

3,997,308

APPARATUS FOR GATHERING FIBERS INTO A PLURALITY OF SPACED APART STRANDS

Warren W. Drummond, Allison Park, and Robert H. Walters, Freeport, both of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Filed Mar. 31, 1975, Ser. No. 565,985
Int. Cl.² C03B 37/02
U.S. Cl. 65—11 W 7 Claims



1. In an apparatus for forming glass fibers comprising: a bushing having a plurality of orifices therein from which glass fibers are drawn; an applicator for applying a lubricant to the individual fibers; means for gathering said fibers into a plurality of strands; and means for applying attenuating forces to said strands and the individual filaments associated therewith, the improvement wherein said means for gathering the fibers into a plurality of spaced apart strands comprises a circular cylindrical bar member oriented at an acute angle to the application surface of said applicator over which the fibers pass, said angle being determined when said application surface and said bar member are interpolated to be in touching relationship, and a circular cylindrical roller oriented approximately perpendicular to the application surface of said applicator to provide gathering of the individual fibers into a plurality of spaced apart strands by sequentially passing the fibers over said applicator, over said bar member and over said roller.

3,997,309

COOLING TUBE SUPPORT SYSTEM FOR FIBERIZING BUSHING

Walter William Harris, Toledo, Ohio, assignor to Johns-Manville Corporation, Denver, Colo.

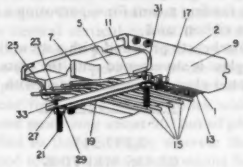
Filed July 31, 1975, Ser. No. 600,651
Int. Cl.² C03B 37/02
U.S. Cl. 65—12 8 Claims

1. In a fiberizing bushing for making fibers from a molten inorganic material comprising a bushing for containing the molten material, said bushing having a bottom wall containing a plurality of rows of orifices and orifice tips surrounding said orifices, a plurality of cooling tubes for cooling said rows of

orifice tips, alignment means for aligning said cooling tubes, and support means for supporting said cooling tubes; the improvement comprising:

a. said support means comprising a plurality of elongated rod means extending below the bottom wall of the bushing, a rod means being located adjacent to each outermost cooling tube at each end of the bushing,

b. a cooling tube support member for spanning beneath said plurality of cooling tubes at each end of said bushing,



each end portion of said support member at least partially surrounding one of the elongated rod means, at least one end portion of said support member being movable laterally, with respect to the elongated rod means which said end portion at least partially surrounds, and

c. means for moving the end portions of said cooling tube support members along said elongated rod means whereby said cooling tubes can be properly spaced from the said bottom wall.

3,997,310

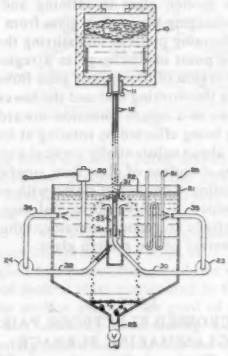
METHOD AND APPARATUS FOR FORMING GLASS BEADS

Eugene J. Cone, Cheswick, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed Sept. 2, 1975, Ser. No. 609,646

Int. Cl.² C03B *19/10*

U.S. Cl. 65—21 **10 Claims**



5. A method of producing glass beads, comprising the steps of:

a. forming molten glass into a plurality of streams of beads falling in an array around a central zone;

b. catching said beads in a bath of quenching fluid while said beads are in a softened state;

c. dispersing said beads outwardly, away from said central zone by means of a stream of fluid directed radially outward from said central zone closely adjacent the region of the bath into which the beads fall, so as to substantially prevent collisions between beads.

3,997,311

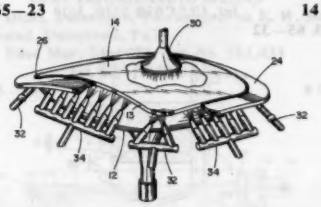
METHOD OF SEPARATING A FUNNEL AND FLANGELESS FACEPLATE OF A COLOR TELEVISION PICTURE TUBE BULB

Melvin F. Rogers, Western Springs, Ill., assignor to Zenith Radio Corporation, Chicago, Ill.

Filed Apr. 1, 1976, Ser. No. 672,816

Int. Cl.² C03B *33/06*

U.S. Cl. 65—23 **14 Claims**



1. For use in salvaging parts from a color television cathod ray tube of a type having a glass bulb comprising an approximately rectangular, flangeless, curved faceplate and a funnel having a convex seal land which mates with a concave rear surface of the faceplate to define a contoured sealing interface, the faceplate being sealed to the funnel with a frit material located at the sealing interface, a method for separating the funnel and faceplate comprising:

establishing a bulb to be opened at a predetermined initial temperature; and

concurrently down-shocking (effecting a sudden cooling of the surface of) the faceplate and the corner regions of the funnel for a predetermined brief period of time to cause separation at the sealing interface of the faceplate from the corner regions of the funnel, and then down-shocking the side regions of the funnel near the sealing interface for a predetermined brief period of time while continuing to downshock the faceplate and the corner regions of the funnel to cause a complete separation of the faceplate from the funnel at the sealing interface.

3,997,312

METHOD OF MANUFACTURING COLORED GLASS ARTICLES

Lucas Besselink, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 418,080, Nov. 21, 1973, abandoned. This application Apr. 2, 1975, Ser. No. 564,306

Claims priority, application Netherlands, Dec. 5, 1972, 7216461

Int. Cl.² C03C *15/00, 17/26, 21/00*

U.S. Cl. 65—30 E **4 Claims**

1. A method of manufacturing glass articles, comprising the steps of:

providing a pressed glass face-plate panel for an infrared radiator consisting essentially of in percent by weight:

SiO_2	77.4	Li_2O	0.2
B_2O_3	14.9	Al_2O_3	1.5
Na_2O	4.5	F	0.2
K_2O	0.3	As_2O_3	1.0

subjecting the surface of said panel to the action of an etching solution containing hydrofluroic acid, so that a surface layer of at least 10 μm is removed by etching;

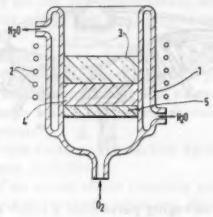
coating said etched panel with a paste containing a silver compound; and

heating said coated panel so as to diffuse ions from said paste into said panel under reducing conditions, thereby producing a red color in said panel.

3,997,313
METHOD FOR MAKING OXIDE GLASSES

John Henry Alexander, Bishops Stortford, England, assignor to International Standard Electric Corporation, New York, N.Y.

Filed July 16, 1975, Ser. No. 596,548
Claims priority, application United Kingdom, Aug. 6, 1974, 34548/74
Int. Cl.² C03B 9/30, 5/00
U.S. Cl. 65—32 7 Claims

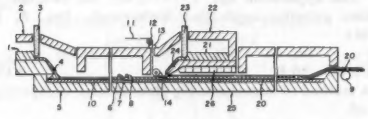


1. A method for preparing high purity laser and optical fiber glass comprising the steps of:
separately zone refining a plurality of separate metals to obtain a corresponding plurality of high purity metals;
heating the high purity metals together in a cooled crucible to obtain a mixture of the high purity metals;
introducing an atmosphere of argon and oxygen to the surface of the mixture of the high purity metals to form a protective oxide coating on the surface of the metals;
bubbling oxygen through the mixture of the high purity metals to form a corresponding mixture of high purity metal oxides; and
heating the mixture of high purity oxides to form the high purity glass.

3,997,314
PROCESS AND APPARATUS FOR MANUFACTURING A WIRE REINFORCED FLOAT GLASS

Shigeo Ono, Kanagawa, and Takao Terakado, Tokyo, both of Japan, assignors to Asahi Glass Co., Ltd., Tokyo, Japan

Filed Feb. 19, 1976, Ser. No. 659,532
Claims priority, application Japan, Feb. 28, 1975, 50-24037
Int. Cl.² C03B 18/02
U.S. Cl. 65—51 6 Claims



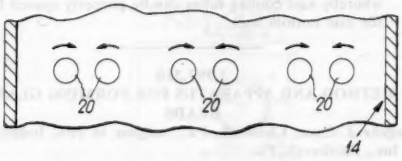
1. A process for manufacturing a reinforced float glass which comprises the steps of:
feeding a molten glass continuously into a tank of a molten metal bath maintained in a non-oxidizing atmosphere;
forming a glass ribbon by advancing the molten glass in a ribbon form in contact with the molten metal bath;
imparting a predetermined thickness to the glass ribbon;
cooling the glass ribbon down to a temperature at which a metal wire will no longer sink;
superposing a metal wire and a molten glass onto the glass ribbon, thereby forming a laminated glass ribbon embedded with the metal wire;
further advancing the laminated glass ribbon along the molten metal bath to flatten the upper surface thereof; and
cooling and withdrawing the laminated glass ribbon from the tank of the molten metal bath.

5. An apparatus for manufacturing a reinforced float glass which comprises:
a tank containing a molten metal bath in which is maintained a non-oxidizing atmosphere over the bath;
a first forehearth provided with a spout lip, from which molten glass is fed onto the molten metal bath to form a glass ribbon;
traction means for imparting a predetermined thickness to the glass ribbon by applying a transverse tractive force to both edges of the glass ribbon;
metal wire feeding means for superposing a metal wire onto the glass ribbon; and
a second forehearth provided with a spout lip, from which a molten glass is superposed onto the glass ribbon to form a laminated glass ribbon embedded with the metal wire.

3,997,315
GLASS MELTING

William Jackson Rhodes, Prescot, and Derek Marshall, Wigan, both of England, assignors to Pilkington Brothers Limited, St. Helens, England

Filed Apr. 25, 1975, Ser. No. 571,822
Claims priority, application United Kingdom, Apr. 26, 1974, 18458/74
Int. Cl.² C03B 5/18
U.S. Cl. 65—135 2 Claims



1. A method of producing molten glass comprising feeding glass forming material to one end of a glass melting tank, melting the material in a melting zone of the tank, refining and conditioning the molten glass in refining and conditioning zones before discharging the molten glass from the other end of the tank to a forming process, and stirring the molten glass in its path to the point of discharge in a region of the tank where the upper region of the molten glass flows in a forward direction towards the working end and the lower region of the molten glass flows in a return direction towards the melting zone, the stirring being effected by rotating at least one pair of adjacent stirrers about substantially vertical axes spaced side-by-side across the direction of glass flow, operating each pair of stirrers by rotating them out-of-phase with each other, the stirrers being shaped to cause horizontal movement of the glass and substantially no vertical movement thereby effecting horizontal attenuation of the molten glass.

3,997,316
USE OF CROSSED ELECTRODE PAIRS IN A GLASSMAKING FURNACE

Harry S. Koontz, Pittsburgh, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed Jan. 19, 1976, Ser. No. 650,388
Int. Cl.² C03B 5/02
U.S. Cl. 65—136 3 Claims

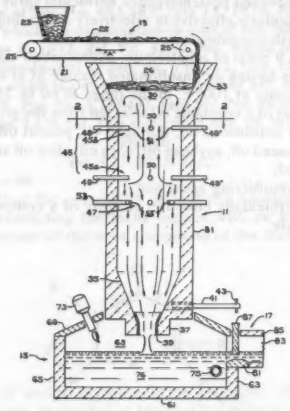
1. A furnace for melting and refining glass comprising
a. a walled, vertically elongated chamber for holding molten glass having an uppermost portion for receiving glass batch materials, a major portion for melting and refining glass and a lowermost portion provided with a discharge opening, the chamber so shaped as to have a central vertical axis;
b. means for charging glass batch materials to the chamber as a layer over substantially all of its uppermost portion at

a rate sufficient to maintain a pool of molten glass in the chamber with a glassbatch interface in the uppermost portion;

c. a first group of electrodes at a first elevation comprising two pairs of electrodes extending inwardly into the major portion of the chamber with the electrodes of each pair positioned in diametrically opposing relationship across the chamber and with pairs of electrodes displaced from one another such that a line joining the electrodes of one pair intersects normally a line joining the electrodes of the other pair at a locus of normal intersection substantially at the central vertical axis of the furnace wherein each electrode of each pair of electrodes is substantially smaller than the inside periphery of the chamber;

d. means for providing electric power to each pair of electrodes of said first group of electrodes with the power applied to one pair being about 90° out of phase with the power applied to the other pair wherein the electrodes are connected to the electric power means for energizing the electrodes to heat molten glass at the central axis of the chamber for establishing an upward flow of glass therein only about the central axis of the chamber; and

e. a second group of electrodes at a lower elevation in the major portion of the chamber than said first group of electrodes and extending into the furnace sufficiently for



establishing electric current paths between adjacent electrodes about the periphery of the chamber providing means for directing electric currents through molten glass adjacent the walls of said chamber.

3. A method of melting and refining glass in a vertically elongated furnace comprising the steps of

a. charging glass batch materials as a layer onto the surface of a pool of molten glass maintained in the furnace;

b. heating the molten glass of the pool of molten glass by directing two normally intersecting electric currents, each extending diametrically across the width of the pool of molten glass with the normally intersecting currents about 90° out of phase with one another while maintaining the orientation of the currents so that their region of intersection remains in a central portion of the pool of molten glass whereby the glass is heated in the central portion sufficiently to establish an upward flow of molten glass only in the central portion of the pool of molten glass;

c. heating the molten glass of the pool of molten glass about a peripheral portion of the pool of molten glass at an elevation below that at which the molten glass in the central portion of the pool is heated, wherein said heating is sufficient to retard without reversing a downward flow of molten glass in the peripheral portion of the pool; and

d. discharging a portion of the molten glass from a lower portion of the pool of molten glass for forming the discharged glass into flat glass.

3,997,317

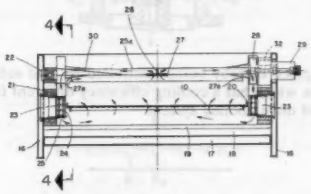
GLASS ANNEALING LEHR HAVING GAS AND ELECTRIC HEATING MEANS

Charles E. Dicks, Uniontown, Pa., assignor to E. W. Bowman Incorporated, Uniontown, Pa.

Filed Mar. 24, 1975, Ser. No. 561,433

Int. Cl.² C03B *25/04*

U.S. Cl. 65—350 **4 Claims**



1. In a glass annealing furnace, the combination comprising a plurality of tunnel shaped lehr heating sections serially arranged to constitute an elongated heating chamber, a perforated endless conveyor movable longitudinally through said lehr for supporting the ware to be annealed, each of said heating sections having air circulation and recirculation ducts above said conveyor and communicating with vertical ducts at opposite sides of the heating sections, gas burner means disposed adjacent to said vertical ducts, fan means positioned in each of said vertical ducts for directing air downwardly through said vertical ducts around said gas burner means to an area below said conveyor, the heated air being thereafter directed upwardly through said conveyor and over said ware, into said recirculation duct and thereafter to said circulation duct for recirculating passage to said vertical ducts, an exhaust vent communicating with said heating chamber and provided with damper means for controlling the exhaust of air from said treatment chamber, air inlet means mounted in each side wall of said heating section and communicating with the inlet of said fan means for supplying ambient air to the heating chamber, each of said air inlet means including a generally cylindrical portion open at the outer end thereof for receiving ambient air and an inner mounting portion positioned in an opening in said side wall, the mounting portion being formed with openings through which the shaft of said fan means can pass, said cylindrical portion having mounted therein an adjustable damper means.

3,997,318

PLUNGER FOR FORMING HOLLOW GLASS ARTICLES

Yoshio Takatoki, Takasago, and Mitsuo Nakata, Funabashi, both of Japan, assignors to Asahi Glass Co., Ltd., Tokyo, Japan

Filed Oct. 16, 1975, Ser. No. 623,017

Claims priority, application Japan, Oct. 16, 1974, 49-118023

Int. Cl.² C03B *11/10*

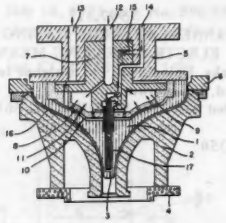
U.S. Cl. 65—362 **5 Claims**

1. A plunger for forming a hollow glass article which has a nose piece projecting substantially axially from a main pressing surface of the plunger, comprising:

a circulatory main cooling system which is disposed interiorly of said plunger for cooling said main pressing surface extending substantially annularly around said axially extending, projecting nose piece; and

a circulatory sub-cooling system which is disposed substantially solely interiorly of said axially extending, projecting nose piece for cooling said nose piece.

said sub-cooling system being separate and independent of said main cooling system and including a coolant different from that of said main system, the temperature of said



nose piece thereby being controlled by said sub-cooling system which has a cooling efficiency different from that of said main cooling system.

3,997,319

FERTILIZING METHOD

Louis E. Ott, St. John, Ind., assignor to Standard Oil Company (Indiana), Chicago, Ill.

Continuation of Ser. No. 399,291, Sept. 21, 1973, which is a continuation of Ser. No. 198,962, Nov. 15, 1971, abandoned. This application Sept. 30, 1974, Ser. No. 510,168
The portion of the term of this patent subsequent to Dec. 17, 1991, has been disclaimed.
Int. Cl.² C05D 9/02
U.S. Cl. 71—27 5 Claims

1. The method of fertilizing agricultural soil for supplying zinc and nitrogen plant nutrients to plants growing in the soil which consists of applying a liquid ionic solution of ammonia and zinc below the surface of the soil, said solution consisting essentially of a zinc carboxylate containing 1 to 5 carbon atoms from about 0.01 to about 20 weight percent zinc and substantially anhydrous liquid ammonia.

3,997,320

PROCESS OF PROMOTING THE FLOWERING OF MANGO TREES AND COMPOSITIONS USED THEREFOR

Restituto L. Bugante, Laguna, Philippines, assignor to Alfonso G. Puyat, Makati, Philippines

Filed Sept. 24, 1975, Ser. No. 616,355
Claims priority, application Philippines, Dec. 24, 1974, 8714
Int. Cl.² C05D 3/02
U.S. Cl. 71—63 4 Claims

1. A composition for promoting the flowering of mango trees which comprises:

A. from about 7 to 15% by weight of a salt of calcium selected from the group consisting of calcium hydroxide and calcium carbonate;
B. from about 0.06 to 0.08% by weight potassium hydroxide;
C. from about 0.05 to 0.07% by weight phosphoric acid;
D. from about 15.00 to 25.00% by weight nitric acid;
E. from about 0.0005 – 0.0007% by weight ammonium hydroxide;
F. from about 0.001 –0.006% by weight manganese sulfate;
G. from about 0.006 –0.10% by weight ferrous sulfate;
H. from about 0.00002 to 0.003% by weight zinc sulfate;
I. from about 0.15 to 0.35% by weight magnesium sulfate;
J. balance water.

3,997,321

1-(5-T-BUTYL-1,3,4-THIADIAZOL-2-YL)-3-METHYL-5-ACETYLOXY-1,3-IMIDAZOLLDIN-2-ONE

John Krenzer, Oak Park, Ill., assignor to Velsicol Chemical Corporation, Chicago, Ill.

Filed Apr. 14, 1975, Ser. No. 567,468
Int. Cl.² C07D 285/12
U.S. Cl. 71—90 3 Claims

1. The compound 1(5-t-butyl-1,3,4-thiadiazol-2-yl)-3-methyl-5-acetyloxy-1,3-imidazolidin-2-one.

2. A herbicidal composition comprising an inert carrier and, as an essential active ingredient, in a quantity toxic to weeds, the compound of claim 1.

3. A method of controlling weeds which comprises contacting the weeds with a herbicidal composition comprising an inert carrier and, as an essential active ingredient, in a quantity toxic to weeds, the compound of claim 1.

3,997,322

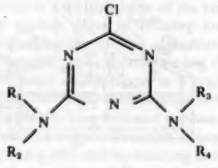
HERBICIDE CARRIER OIL COMPOSITION

Edward L. Ratledge, Claymont Heights, Del., assignor to Sun Oil Company of Pennsylvania, Philadelphia, Pa.

Filed Sept. 9, 1970, Ser. No. 70,876
Int. Cl.² A01N 9/22
U.S. Cl. 71—93 2 Claims

1. An improved postemergence herbicidal spray oil composition particularly effective in selectively controlling unwanted plant growth consisting essentially of:

(a) 1 to 9 parts of a petroleum hydrocarbon oil characterized as having an unsulfonated residue of at least 75 and a viscosity at 100° F. in the range of 60 to 350;
(b) 1 part of a vegetable oil selected from the group consisting of cottonseed oil, rapeseed oil, peanut oil, sunflower oil, linseed oil, soybean oil, corn oil, olive oil and mixtures thereof;
(c) an emulsifying agent and
(d) a herbicidally effective quantity of a compound of the formula



wherein R_1 R_2 R_3 and R_4 represent a member selected from the group consisting of hydrogen, alkyl, alkenyl, hydroxyalkyl, arakyl and cycloalkyl radicals and each of the pairs of radicals R_1 and R_2 and R_3 and R_4 together with the corresponding nitrogen atom represents a member selected from the group consisting of five or six membered alkylamino radicals and the morpholino radical.

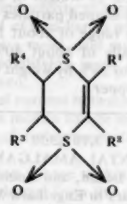
3,997,323

HERBICIDAL METHOD EMPLOYING SUBSTITUTED DITHIN TETROXIDES

Arthur D. Brewer, Guelph, Canada; Robert W. Neidermyer, Cheshire, Conn., and William S. McIntire, Senatobia, Miss., assignors to Uniroyal Inc., New York, N.Y. and Uniroyal, Ltd., Canada

Division of Ser. No. 357,757, May 7, 1973, Pat. No. 3,920,438.
This application May 12, 1975, Ser. No. 576,485
Int. Cl.² A01N 9/12
U.S. Cl. 71—91 27 Claims

1. A method of controlling weeds comprising applying to a locus at which it is desired to control said weeds, in a herbicidally effective amount, a 2,3-dihydro-1,4-dithiin 1,1,4,4-tetroxide of the formula:



wherein R^1, R^2, R^3 and R^4 are selected from the group consisting of hydrogen and lower alkyl having one to two carbon atoms, not more than two of the R's being hydrogen, or an adjacent pair of R's are connected together in the form of a chain of three to four methylene groups.

3,997,324

HERBICIDAL N- OXYTHIO-SUBSTITUTED UREAS

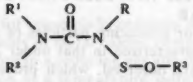
Melancthon S. Brown, deceased, late of Berkeley, Calif. (by Gustave K. Kohn, special administrator), and Gustave K. Kohn, Berkeley, Calif., assignors to Chevron Research Company, San Francisco, Calif.

Division of Ser. No. 483,583, July 11, 1974, Pat. No. 3,928,407, which is a continuation-in-part of Ser. No. 250,907, May 8, 1972, Pat. No. 3,853,966, which is a continuation-in-part of Ser. No. 189,732, Oct. 15, 1971, abandoned, which is a continuation-in-part of Ser. No. 88,212, Nov. 9, 1970, Pat. No. 3,755,437, said Ser. No. 88,105, Nov. 9, 1970, Pat. No. 3,679,733. This application Aug. 29, 1975, Ser. No. 608,866

Int. Cl.² A01N 9/12

U.S. Cl. 71—98 **30 Claims**

1. A method for controlling undesirable vegetation which comprises contacting the locus thereof with an herbicidally effective amount of the urea compound of the formula:



wherein R, R^1 and R^2 individually are hydrogen, alkyl of 1 to 6 carbon atoms, cycloalkyl or bicycloalkyl of up to 10 carbon atoms, alkoxy of 1 to 4 carbon atoms, carbocyclic mononuclear or binuclear aryl of 6 to 12 carbon atoms substituted with up to 2 fluorine, chlorine, bromine, nitro, trifluoromethyl or alkoxy of 1 to 4 carbon atoms; and R^3 is alkyl of 1 to 10 carbon atoms, cycloalkyl or bicycloalkyl of up to 10 carbon atoms or carbocyclic mononuclear or binuclear aryl of 6 to 12 carbon atoms, substituted with up to 2 fluorine, chlorine, bromine, nitro, trifluoromethyl, or alkoxy of 1 to 4 carbon atoms.

3,997,325

(ALKYNYLOXY)ALKYL AND (ALKENYLOXY)ALKYL CARBAMATES AND THEIR USE AS HERBICIDES

Barrington Cross, Rocky Hill, and Charles Paul Grasso, Cranbury, both of N.J., assignors to American Cyanamid Company, Stamford, Conn.

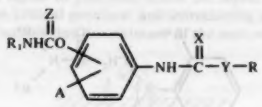
Division of Ser. No. 363,783, May 24, 1973, Pat. No. 3,914,285. This application June 5, 1975, Ser. No. 583,930

Int. Cl.² A01N 9/20

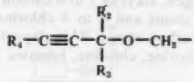
U.S. Cl. 71—111 **21 Claims**

1. A method for controlling undesirable plant species comprising:

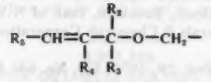
applying to the locus thereof, a herbicidally effective amount of a compound having the formula



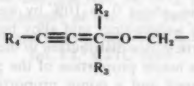
wherein R is alkyl C_1–C_6, alkenyl C_2–C_6, alkynyl C_3–C_6, cycloalkyl C_3–C_7, phenyl, benzyl,



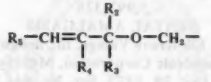
or



X, Y and Z each represent oxygen; A is hydrogen, alkyl C_1–C_4 chlorine or bromine; R_1 is



or



R_2 and R_3 are hydrogen or alkyl C_1–C_4; and R_4 and R_5 are hydrogen, chlorine or alkyl C_1–C_4; with the proviso that A and

are meta- and para- to the

group, respectively, or para- and meta-, respectively.

3,997,326

HERBICIDAL N-(N'-ALKYNYLCARBAMYLMETHYL) 2,6-DIALKYL-ALPHA-HALOACETANILIDES

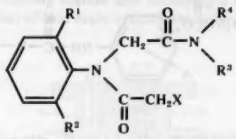
David Cheong King Chan, San Francisco, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Continuation-in-part of Ser. No. 515,781, Oct. 17, 1974, Pat. No. 3,944,607. This application Feb. 23, 1976, Ser. No. 660,086

Int. Cl.² A01N 9/20

U.S. Cl. 71—118 **14 Claims**

1. A method for controlling the growth of undesirable vegetation which comprises applying to the vegetation or the growth medium of the vegetation an herbicidally effective amount of a compound of the formula



wherein R^1 and R^2 individually are alkyl of 1 to 6 carbon atoms; R^3 is hydrogen, alkyl of 1 to 6 carbon atoms, haloalkyl of 1 to 2 carbon atoms and 1 to 4 chlorine or bromine, or alkynyl of 3 to 6 carbon atoms; R^4 is alkynyl of 3 to 6 carbon atoms; and X is fluorine, chlorine, bromine or iodine.

3,997,327

DENTAL COMPOSITION

Albert Tolliver, Summit, N.J.; Joseph Aliotta, Staten Island, and Louis F. Alcuri, Brooklyn, both of N.Y., assignors to Engelhard Minerals & Chemicals Corporation, Murray Hill, N.J.

Filed Dec. 29, 1975, Ser. No. 644,872
Int. Cl.² C22C *5/06*
U.S. Cl. .5 R **7 Claims**

1. A composition adapted for amalgamation with mercury to form a dental amalgam comprising an alloy consisting essentailly of about 55 to 75% by weight silver, about 20 to 40% by weight tin, about 0 to 10% by weight copper, and about 0 to 2% by weight zinc, said alloy being in particulate form having a particle size distribution in the range of about 1 to 100 microns, a major proportion of the particulates being spheroidal in shaped and a minor proportion thereof being substantiallty irregularly shaped.

3,997,328

DENTAL AMALGAMS

Evan H. Greener, Elk Grove Village, Ill., assignor to Engelhard Minerals & Chemicals Corporation, Murray Hill, N.J.

Filed Dec. 29, 1975, Ser. No. 644,870
Int. Cl.² C22C *7/00*
U.S. Cl. 75—0.5 R **8 Claims**

1. A composition adapted for amalgamation with mercury to form a dental amalgam consisting essentially of a uniform admixture of a major proportion of a first alloy composed of about 40 to 70% by weight silver, about 10 to 30% by weight tin and about 20 to 40% by weight copper in particulate form, and a minor proportion of a second alloy composed of about 55 to 75% by weight silver, about 20 to 40% by weight tin, about 0.05 to 10% by weight copper and about 0.1 to 2.0% by weight zinc in particulate form.

3,997,329

DENTAL COMPOSITION

Joseph Aliotta, Staten Island, and Louis F. Alcuri, Brooklyn, both of N.Y., assignors to Engelhard Minerals & Chemicals Corporation, Murray Hill, N.J.

Filed Dec. 29, 1975, Ser. No. 644,869
Int. Cl.² C22C *7/00*
U.S. Cl. 75—.5 R **8 Claims**

1. A composition adapted for amalgamation with mercury to form a dental amalgam comprising a substantially uniform blend of:

a. a major proportion by weight of a first alloy in the form of spheroidal particles having a particle size distribution in the range of about 1 to about 100 microns and consisting essentially of about 47% to 70% by weight silver, about 20% to 32% by weight tin, and about 7% to 27% by weight copper, each of the spheroidal particles of said first alloy having a gradient composition from the surface to the center thereof; and

b. a minor proportion by weight of a second alloy in the form of irregularly-shaped particles having a particle size distribution in the range of about 1 to 100 microns and consisting essentially of about 40% to 70% by weight silver, about 10% to 30% by weight tin, and about 20% to 40% by weight copper.

3,997,330

DENTAL AMALGAMS

Joseph Aliotta, Staten Island, and Louis F. Alcuri, Brooklyn, both of N.Y., assignors to Engelhard Minerals & Chemicals Corporation, Murray Hill, N.J.

Filed Dec. 29, 1975, Ser. No. 644,871
Int. Cl.² C22C *7/00*
U.S. Cl. 75—.5 R **7 Claims**

1. A composition adapted for amalgamation with mercury to form a dental amalgam comprising a substantially uniform blend of:

a. a major proportion by weight of a first alloy in the form of spheroidal particles having a particle size distribution in the range of about 1 to about 100 microns and consisting essentially of about 40% to 70% by weight silver, about 10% to 30% by weight tin, and about 20% to 40% by weight copper; and

b. a minor proportion by weight of a second alloy in the form of irregularly-shaped particles having a particle size distribution in the range of about 1 to 100 microns and consisting essentially of about 55% to 75% by weight silver, about 20% to 40% by weight tin, about 0.05% to 10% by weight copper and about 0.1% to 2% by weight zinc.

3,997,331

METALLIZED SALTS

Denis Tither, Clitheroe, England, assignor to Crysus (Lancashire) Limited, Chorley, England

Filed Aug. 13, 1973, Ser. No. 387,675
Claims priority, application United Kingdom, Aug. 16, 1972, 38105/72; Oct. 27, 1972, 49637/72
Int. Cl.² B22F *9/00;* **C22B** *34/36;* **C01G** *41/00*
U.S. Cl. 75—.5 AB **7 Claims**

1. A process for producing particles of ammonium paratungstate and characterized in that under X-ray analysis no diffracted lines are observed, which process comprises the steps of placing a solution of ammonium paratungstate in a chamber, closing the chamber, reducing the pressure within the chamber below atmospheric pressure, freezing the solution by the combined effect of admitting to the chamber a liquid refrigerant which is inert to said ammonium paratungstate whereby the liquid refrigerant evaporates, the amount of liquid refrigerant admitted to the chamber being not sufficient to raise the pressure in the chamber to atmospheric pressure and circulating a cold fluid through heat exchange means in said chamber, and thereafter evaporating the solvent from the frozen solution.

3,997,332

STEELMAKING BY THE ELECTROSLAG PROCESS USING PREREDUCED IRON OR PELLETS

Ralph H. Nafziger, Albany, and Clo E. Armantrout, Corvallis, both of Oreg., assignors to The United States of America as represented by the Secretary of the Interior, Washington, D.C.

Filed Jan. 8, 1976, Ser. No. 647,309
Int. Cl.² C22B *4/00;* **B22D** *27/02*
U.S. Cl. 75—10 R **7 Claims**

1. A method for preparing carbon steel shapes from prereduced iron ore pellets which consists essentially of:

compressing prereduced iron ore pellets having a metallization of at least 92% and an oxygen content below 2.8%

into an elongated bar having sufficient structural strength and electrical conductivity to serve as an electrode;

immersing one end of said bar as an electrode in a molten flux contained in a mold, said mold having a base plate upon which a solidifying ingot acting as a secondary electrode is formed;

passing an electrical current between said bar and said base plate through the molten flux to melt the bar and to form a steel shape conforming generally to the shape of said mold;

maintaining a carbon source within said molten flux, said carbon source selected from the group consisting of silicon carbide, titanium carbide and mixtures thereof dispersed in said flux, and

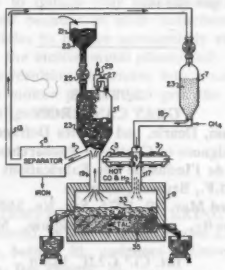
recovering a structurally sound steel shape containing carbon in the range of 0.01 to 1.5 wt-pct.

3,997,333

PROCESS FOR THE REDUCTION OF COMPLEX METALLIC ORES

Maurice G. Fey, Pittsburgh, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Feb. 26, 1975, Ser. No. 553,404
Int. Cl.² C21C *5/52*
U.S. Cl. 75—11 **8 Claims**



1. In a process for sequentially reducing metals from an ore containing a plurality of metal oxides, comprising the steps of

a. heating the ore in a reducing gas atmosphere comprising a hydrocarbon at a temperature sufficient to reduce at least one oxide of a metal having a lower affinity for oxygen than at least another metal present,

b. separating the metal from the metal oxides reduced in step (a),

c. treating the ore in an arc heater in a reducing gas atmosphere comprising a hydrocarbon to reduce said other metal oxide to elemental form, the amount of reducing gas present being in excess of the required, and

d. recirculating the excess amount of reducing gas to step (a) to preheat and prereduce said metal oxide of lower oxygen affinity.

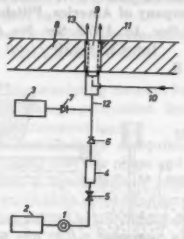
3,997,334

INTRODUCTION OF A LIQUID INTO A RECEPTACLE SUCH AS A CONVERTER

Stanislas Dlubek, Montignies-le-Tilleul, Belgium, assignor to Centre de Recherches Metallurgiques-Centrum voor Research in de Metallurgie, Brussels, Belgium

Continuation of Ser. No. 354,435. This application May 15, 1975, Ser. No. 577,783
Claims priority, application Belgium, Apr. 28, 1972, 782888
Int. Cl.² C21C *5/30;* **F04B** *49/08*
U.S. Cl. 75—60 **10 Claims**

1. A method of introducing a liquid into a receptacle comprising supplying the liquid to a supply line which communicates with at least one injection conduit opening out into the receptacle, providing the supply line with a non-return valve allowing the liquid to pass only when the liquid pressure exceeds a given critical pressure, and introducing a gas into the liquid in the supply line downstream of the non-return valve at



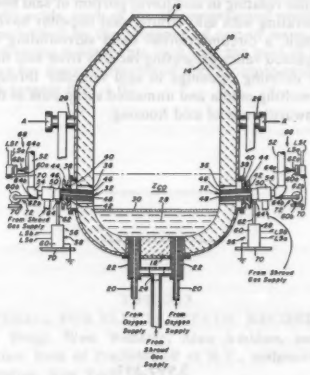
a pressure sufficient to prevent any material in the receptacle from penetrating into the at least one injection conduit, whereby a mixture of gas and liquid is introduced into the receptacle.

3,997,335

METHOD OF OPTIMUM BURNING OF CARBON MONOXIDE IN A CONVERTER

William A. Kolb, Forest Hills Borough, and Jack F. Sigh, Crafton Borough, both of Pa., assignors to United States Steel Corporation, Pittsburgh, Pa.

Division of Ser. No. 309,018, Nov. 24, 1972, Pat. No. 3,895,714, and a continuation-in-part of Ser. No. 295,761, Oct. 6, 1972, abandoned. This application Apr. 3, 1975, Ser. No. 564,942
Int. Cl.² C21C *5/34*
U.S. Cl. 75—60 **18 Claims**



1. A method of optimum burning of carbon monoxide produced in a carbon monoxide zone being fed oxygen by a side tuyere above a molten metal bath in a converter, to carbon dioxide thereby producing a substantially maximum amount of heat within said converter to melt scrap in said converter, said method including the steps of

a. sensing in initial effectiveness signal of the amount of carbon monoxide in said carbon monoxide zone being burned to carbon dioxide at a predetermined point relative to said converter;

b. monitoring a continuing effectiveness signal;

c. comparing said continuing effectiveness signal with said initial effectiveness signal; and

d. moving said side tuyere relative to said converter when said continuing effectiveness signal is greater than said initial effectiveness signal to increase the amount of carbon monixide in said carbon monoxide zone being burned to carbon dioxide

3,997,336

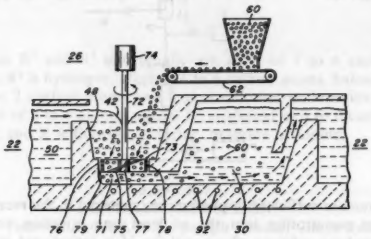
METAL SCRAP MELTING SYSTEM

Jan H. L. van Linden, Allison Park; Joseph R. Herrick, Verona, and Michael J. Kinosz, Apollo, all of Pa., assignors to Aluminum Company of America, Pittsburgh, Pa.

Filed Dec. 12, 1975, Ser. No. 640,052

Int. Cl.² C22B 21/00

U.S. Cl. 75—68 R 22 Claims



1. A method of melting metal scrap in a molten melting media comprising:

a. introducing a supply of said scrap to a housing having upper and lower portions with a volute located in said lower portion, said housing containing a body of molten melting media to initiate melting of said scrap therein, and

b. continuously depleting and replenishing said body of molten melting media simultaneously with melting said metal scrap by downwardly discharging melting media and unmelted scrap out of said housing by action of an impeller rotating in said lower portion of said housing and cooperating with said volute, said impeller having a central hub, a circumferential band surrounding said hub, and canted vanes projecting radially from said hub to said band defining openings in said impeller through which said melting media and unmelted scrap pass as they move downwardly out of said housing.

3,997,337

SEPARATION AND/OR PURIFICATION OF PRECIOUS METALS

Willem H. Pittie, Rooderpoort, Transvaal, and Gerhardus Overbeek, Florida, Transvaal, both of South Africa, assignors to Swarsab Mining, Exploration & Development Company (Proprietary) Limited, Johannesburg, South Africa

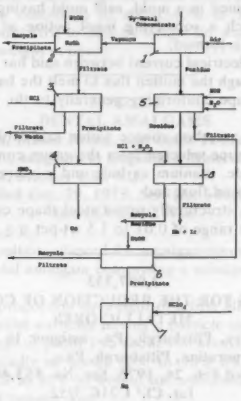
Filed Aug. 29, 1975, Ser. No. 609,155

Claims priority, application South Africa, Apr. 3, 1975, 75/2093

Int. Cl.² C22B 11/00

U.S. Cl. 75—121 9 Claims

1. A process for the recovery of rhodium, ruthenium, iridium and osmium values from a concentrate containing said values as well as impurities selected from the group consisting essentially of lead, arsenic, silver, bismuth and tellurium, said process comprising (a) heating said concentrate at a temperature of between about 1100° C. and 1500° C. in a gaseous stream containing oxygen for a time sufficient to quantitatively volatilize and separate the impurities and the osmium values from said concentrate and to leave a residue containing oxidized ruthenium, rhodium and iridium values, and (b)



collecting the volatilized impurities and osmium values removed by said gas stream.

3,997,338

GRAY CAST IRON

Jan Van Eeghem, Deurle, and Charles Defrancq, Zele, both of Belgium, assignors to Centre de Recherches Scientifiques et Techniques de l'Industrie des Fabrications Metalliques, en abrege C.R.I.F., Brussels, Belgium

Filed Mar. 20, 1975, Ser. No. 560,242

Claims priority, application Belgium, Mar. 22, 1974, 812706

Int. Cl.² C22C 38/06

U.S. Cl. 75—124 18 Claims

1. A high strength, low hardness, gray cast iron having a flake graphite structure having a composition consisting essentially of about 1-3% aluminum, 2-4% carbon, up to 1% silicon, up to 0.7% manganese, up to 0.05% sulfur, up to 0.1% phosphorus and the balance iron, said gray iron having been inoculated with 0.3 to 2% of inoculant alloy, comprising rare earths as active inoculant component in a percentage which corresponds to the addition of 0.015 to 1.5% of rare earths to said composition.

3,997,339

ALUMINUM ALLOY FOIL FOR HIGH VOLTAGE ELECTROLYTIC CAPACITORS

Horst Fickelscher, Heidenheim, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Jan. 16, 1975, Ser. No. 541,510

Claims priority, application Germany, Jan. 25, 1974, 2403626

Int. Cl.² C22C 21/00

U.S. Cl. 75—138 1 Claim

1. An electrolytically etched aluminum alloy foil for a high voltage electrolytic capacitor comprising an aluminum foil containing an item selected from the group consisting of antimony, barium, and zinc in quantities of 5 to 220 ppm, an item selected from the group consisting of lead and bismuth in quantities of up to 0.5 ppm and an item selected from the group consisting of calcium and chromium in quantities of up to 2 ppm, the barium of said group of antimony, barium, and zinc being present in quantities of 20 to 50 ppm.

3,997,340

METHOD OF PREPARING AN ALUMINUM-SILICON COMPOSITE

Robert N. Sanders, Baton Rouge, La., and Alex R. Valdo, Elgin, Ill., assignors to Ethyl Corporation, Richmond, Va.

Continuation of Ser. No. 375,507, July 2, 1973, abandoned, which is a division of Ser. No. 219,523, Jan. 20, 1972, abandoned. This application May 14, 1975, Ser. No. 577,326

Int. Cl.[2] C22C *21/04*

U.S. Cl. 75—147 10 Claims

1. A method for producing an aluminum-silicon composite product containing aluminum as the principal metal, silicon as the principal secondary metal and a dispersion therein of zircon particles comprising the following steps:

a. bringing together with stirring a quantity of aluminum, silicon and magnesium as alloying elements heated to a temperature of about 850° C, sufficient to achieve good fluidity and about five percent to about 80 percent zircon by weight of the composite, the zircon having a particle size of about 60 mesh to about 400 mesh U.S. Sieve Series, the silicon being in an amount of about 19 to about 21 percent by weight of the metallic phase of the composite and the magnesium being in an amount of about two to about ten percent by weight of the metallic phase of the composite;

b. continuing the stirring of the ingredients to cause the magnesium to reduce only the surfaces of the zircon particles and because of such reduction to cause the zircon particles to beome substantially stably dispersed throughout the molten metal phase; and,

c. casting the resulting dispersion into a suitable mold to solidify the molten portion and give the composite the desired configuration.

3,997,341

REDUCED TEMPERATURE SINTERING PROCESS

Kenneth R. Janowski, Wheaton, and Charles J. Levesque, Elk Grove Village, both of Ill., assignors to Universal Oil Products Company, Des Plaines, Ill.

Filed Oct. 17, 1974, Ser. No. 515,721

Int. Cl.[2] B22F *3/00*

U.S. Cl. 75—211 8 Claims

1. Method of sintering a powder metal body at temperatures less than the standard sintering temperature, comprising the steps of:

forming a quantity of powder metal particles into a body;

heating the body so formed in a furnace at a reduced temperature less than the standard sintering temperature of said metal,

repeatedly changing the atmosphere in said furnace from an oxidizing nature to a reducing nature a plurality of cycles while maintaining said reduced temperature so as to alternately oxidize and reduce the surface of the metal powder particles, said metal being selected such that said metal is one which will undergo surface oxidation and reduction at said temperature in said furnace.

8. Method of sintering a powder metal body formed of metal chosen form the class consisting of copper, cobalt, iron, nickel, tungsten, molybdenum, tantalum, niobium and alloys thereof comprising the steps of:

forming a quantity of powder metal particles into a body;

heating the body so formed in a furnace in an oxidizing atmosphere to a reduced temperature less than its standard sintering temperature;

changing the atmosphere in said furnace from an oxidizing characteristic to a reducing characteristic while maintaining said reduced temperature;

redox cycling the atmosphere in said furnace from an oxidizing to a reducing characteristic in a plurality of cycles at said reduced temperature to alternately oxidize and reduce the metal particles; and

cooling said body in a reducing atmosphere.

3,997,342

PHOTOCONDUCTIVE ELEMENT EXHIBITING PERSISTENT CONDUCTIVITY

David S. Bailey, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Oct. 8, 1975, Ser. No. 620,726

Int. Cl.[2] G03G *5/09*

U.S. Cl. 96—1.6 17 Claims

1. A photoconductive insulating element having at least two layers comprising a charge-generation layer in electrical contact with a charge-transport layer,

a. said charge-generation layer comprising a continuous, electrically insulating polymer phase and dispersed in said continuous phase a discontinuous phase comprising a finely-divided, particulate co-crystalline complex of (i) at least one polymer having an alkylidene diarylene group in a recurring unit and (ii) at least one pyrylium-type dye salt, said co-crystalline complex, upon exposure to activating radiation for said complex, capable of generating and injecting charge carriers into said charge-transport layer,

b. said charge-transport layer being an organic composition comprising a p-type organic photoconductive charge-transport material capable of accepting and transporting injected charge carriers from said charge-generation layer, said charge-transport material having a polarographic oxidation potential between about +0.90 and +0.50 volts and the capability of forming chemically stable radical cations, and

c. at least one of said charge-transport or said charge-generation layers comprising a protonic acid selected from the group consisting of substituted carbocyclic aromatic carboxylic acids, substituted phenols, substituted naphthols, substituted aliphatic and substituted alicyclic carboxylic acids, and substituted aromatic heterocyclic carboxylic acids, each of the aforementioned protonic acids characterized by the presence of one or more electron-withdrawing substituents such that the sum of the sigma values for the substituents of said protonic acids is equal to or greater than 1.0.

3,997,343

MATERIAL FOR ELECTROSTATIC RECORDING

John W. Weigl, West Webster; Alan Amidon, and Joseph Mammino, both of Penfield, all of N.Y., assignors to GAF Corporation, New York, N.Y.

Continuation of Ser. No. 110,350, Jan. 27, 1971, abandoned, which is a continuation of Ser. No. 723,323, April 18, 1968, abandoned, which is a continuation of Ser. No. 462,931, June 10, 1965, abandoned. This application Oct. 18, 1972, Ser. No. 298,587

Int. Cl.[2] G03G *5/08*, *5/06*

U.S. Cl. 96—1.8 1 Claim

1. An electrostatic recording element suitable for use as a receiving sheet in an electrostatic transfer process, consisting essentially of a translucent, non-conductive base selected from the group consisting of paper, a polyester film, and a polyvinyl fluoride film; a photoconductive layer on the surface of said base comprising a photoconductive zinc oxide and a dye sensitizer suspended in an insulating resin binder selected from the group consisting of a vinyl acetate-crotonic acid copolymer and epoxy esters; and a dielectric polymer resin film overlying said photoconductive layer selected from the group consisting of polyvinyl acetate, vinyl acetate-crotonic acid copolymer, and acrylonitrilestyrene copolymer.

3,997,344

DRY POSITIVE PHOTOPOLYMER IMAGING PROCESS INVOLVING HEATING AND APPLICATION OF TONER

Sheldon Irwin Schlesinger, East Windsor Township, and Ronald J. Boszak, Trenton, both of N.J., assignors to American Can Company, Greenwich, Conn.

Filed July 5, 1974, Ser. No. 486,169
Int. Cl.² G03F 7/08; G03C 5/00, 5/46
U.S. Cl. 96—33 13 Claims

1. A method of forming a photoresist image which comprises forming a mixture consisting of 1). a material polymerizable to higher molecular weights selected from the group consisting of:

a. copolymers of glycidyl acrylate and allyl glycidyl ether and

b. terpolymers of glycidyl acrylate, glycidyl methacylate and allyl glycidyl ether containing up to about 0.25 mole of glycidyl methacrylate per mole of glycidyl acrylate,

said copolymers and terpolymers having an inherent viscosity of from about 0.09 to about 0.28; an epoxide equivalent of at least about 0.64 per 100 grams of polymer and being substantially non-tacky at room temperature, tacky at an elevated temperature and convertible to a nontacky condition upon exposure to irradiation, with 2). a photosensitive aryl diazonium salt of a complex halogenide, which releases a Lewis Acid effective to initiate polymerization of said polymerizable material, said photosensitive salt being present in an amount sufficient to effect polymerization of said polymerizable material in an inert volatile solvent;

applying said mixture to a substrate by removing said solvent to form a tack-free coating at room temperature;

exposing the coated substrate imagewise to irradiation to effect polymerization of said material in the exposed areas;

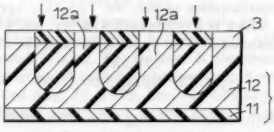
heating the coated substrate to the softening point of the polymer in the unexposed areas of said substrate to render said unexposed material tacky and applying a powdered material to develop an image theron, said powdered material being absorbed only by said tacky unexposed portions of said substrate.

3,997,345

PROCESS FOR PREPARING IMAGE PLATES WITH CONTINUOUS GRADATION

Kiyomi Sakurai, Neyagawa; Yutaka Fukushima, Toyoaka, and Masami Yamaguchi, Sakai, all of Japan, assignors to Nippon Paint Co., Ltd., Osaka, Japan

Filed Jan. 10, 1975, Ser. No. 539,991
Claims priority, application Japan, Jan. 14, 1974, 49-7209; May 17, 1974, 49-56014
Int. Cl.² G03C 5/10
U.S. Cl. 96—35.1 10 Claims



1. In a process for preparing an image plate with continuous gradation having a continuous unevenness which comprises exposing a photosensitive resin plate consisting essentially of a supporting material and a layer of a photopolymerizable resin composition consisting essentially of an addition polymerizable, ethylenically unsaturated compound, a polymeric binding agent, and a photopolymerization initiator provided thereon through a film with continuous gradation by means of ultraviolet rays and subjecting the exposed resin plate to development, the improvement wherein the exposure is conducted under such conditions that air is present between the photopolymerizable resin layer and the film.

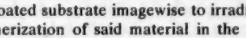
3,997,346

METHOD FOR STABILIZING THE IMAGE OF A THERMALLY DEVELOPABLE PHOTOSENSITIVE MATERIAL

Takao Masuda, and Shinpei Ikenoue, both of Asaka, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed Sept. 11, 1974, Ser. No. 505,174
Claims priority, application Japan, Sept. 11, 1973, 48-102337
Int. Cl.² G03C 5/26, 5/38, 1/02
U.S. Cl. 96—50 PL 21 Claims

1. In a method for forming an image in a thermally developable photosensitive material which comprises imagewise exposing a thermally developable photosensitive material comprising a support having thereon a layer containing at least (a) an organic silver salt; (b) a catalytic amount of a photosensitive silver halide or a compound capable of forming a silver halide upon reaction with the organic silver salt (a); (c) a reducing agent and (d) a binder and heating the thermally developable photosensitive material, the improvement which comprises stabilizing the image formed by contacting the photosensitive layer of the photosensitive material during or after the heating with a polymer film layer containing a compound represented by the following general formula



in which X represents the non-metallic atoms necessary for forming a 5- or 6-membered heterocyclic ring containing at least one of a nitrogen, oxygen or sulfur hetero atom, said compound of the general formula being present in an amount sufficient to stabilize said image.

3,997,347

METHOD AND APPARATUS FOR RECYCLING PHOTOGRAPHIC WASH WATER

Harry N. Parsonage, Dayton, Ohio, assignor to The Mead Corporation, Dayton, Ohio

Filed Apr. 22, 1974, Ser. No. 462,884
Int. Cl.² G03C 5/26, 5/24
U.S. Cl. 96—50 R 5 Claims

1. A method of recycling the wash water in a photographic process, wherein, after having been developed, the film undergoes a final washing or rinsing step in a washing apparatus and a drying step in a drying apparatus to remove any chemicals, including thiosulfate salts from the fix solution, from the film surface comprising the steps of:

a. passing wash water from the film washing apparatus containing chemicals rinsed from the film to an oxidation means comprising a reaction vessel containing wetproofed carbon particles having surface portions in contact with polytetrafluoroethylene resin without being completely encapsulated by said resin;

b. passing warm moist air from the drying apparatus to said oxidation means;

c. reacting the thiosulfate salts in said wash water with oxygen in said air in the presence of said wetproofed carbon particles in said oxidation means to oxidize said thiosulfate salts to sulfate salts; and

d. return said water to the photographic process for reuse in washing the developed film.

3,997,348

COLOR PHOTOGRAPHIC PROCESSING METHOD

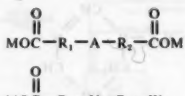
Isao Shimamura, and Haruhiko Iwano, both of Minami-ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed July 15, 1974, Ser. No. 488,853
Claims priority, application Japan, July 13, 1973, 48-78983
Int. Cl.² G03C 7/00
U.S. Cl. 96—56 20 Claims

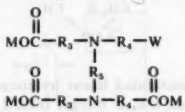
1. In a method for developing, bleaching and then fixing an exposed color silver halide photographic material, the improvement which comprises bleaching said photographic material with a bleaching solution containing a ferric salt, then processing the photographic material with a solution containing an organic acid between said bleaching and said fixing, wherein said organic acid is an organic carboxylic acid represented by the General Formula (I) the General Formula (II) or the General Formula (III)

$$R - COOM \quad (I)$$

wherein R represents an alkyl group having 1 to 12 carbon atoms, an alkenyl group having 1 to 6 carbon atoms or a hydroxy and/or carboxy substituted alkyl group having 1 to 12 carbon atoms or alkenyl group having 1 to 6 carbon atoms; and M represents a hydrogen atom, an alkali metal atom or an ammonium group;



(II)



(III)

wherein A represents a hydrocarbyl group, an oxygen atom, a sulfur atom or an $=NR_6$ group wherein R_6 represents a hydrogen atom or a substituted or unsubstituted hydrocarbyl group; R_1, R_2, R_3, R_4 and R_5 each represents a substituted or unsubstituted hydrocarbyl group; W represents a —COOM or a hydroxy alkyl goup; and M represents a hydrogen atom, an alkali metal atom or an ammonium group; and

wherein said ferric salt is ferric chloride, ferric nitrate, ferric sulfate, ferric bromide, ferric phosphate, ferric perchlorate, ammonium ferric sulfate, ferric citrate, ferric oxalate, or ferric acetate.

3,997,349

LIGHT-SENSITIVE DEVELOPMENT-FREE DRIOGRAPHIC PRINTING PLATE

James F. Sanders, Hudson, Wis., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed June 17, 1974, Ser. No. 479,653
Int. Cl.² G03C 1/54, 1/94
U.S. Cl. 96—75 8 Claims

1. A light-sensitive article comprising a substrate having a light-sensitive continuous coating on a surface thereof, said coating consisting essentially of a diazonium salt formed from an aromatic diazonium compound and an abhesive perfluoroaliphatic acid or salt thereof, said acid containing at least three carbon atoms, said coating being capable of providing adhesive areas and abhesive areas merely upon exposure of said coating to an imagewise pattern of actinic radiation without further treatment thereof the dry coating weight of said coating being sufficient to provide free abhesive acid in only exposed areas which can be displaced by driographic ink whereby said ink deposits in only exposed areas in a negative acting driographic system or said dry coating weight being sufficient to provide so much free abhesive acid in only exposed areas that driographic ink is repelled whereby said ink deposits in only unexposed areas in a positive acting driographic system.

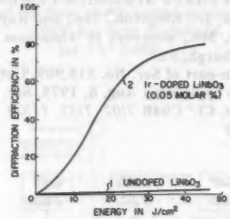
8. A light-sensitive negative acting driographic article comprising a substrate having a gelatin coating on a surface thereof, and overlying said gelatin continuous coating a light-sensitive coating, said light-sensitive coating consisting essentially of a diazonium salt formed from an aromatic diazonium compound and an abhesive perfluoroaliphatic acid or salt thereof, said acid containing at least three carbon atoms, said light-sensitive coating being capable upon exposure to actinic radiation by an imagewise pattern of providing abhesive areas in unexposed areas, and adhesive areas in exposed areas, whereby driographic ink deposits in only said exposed areas.

3,997,350

HOLOGRAPHIC STORAGE MATERIAL

Hirofumi Ikeo; Shoichi Noda; Takao Sawada; Eichi Okamoto, and Katsutoshi Muto, all of Amagasaki, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 27, 1974, Ser. No. 455,353
Claims priority, application Japan, Mar. 27, 1973, 48-35223; Mar. 27, 1973, 48-35225
Int. Cl.² G02B 5/32
U.S. Cl. 96—88 2 Claims



1. A holographic storage material consisting essentially of a single crystal of $LiNb0_3$ and iridium in an amount of 0.001 to 3.0 molar percent.

3,997,351

GLASS-CERAMIC DOPANT HOST FOR VAPOR PHASE TRANSPORT OF B_2O_3

Peter J. Vergano, Toledo, Ohio, and William E. Smith, deceased, late of Toledo, Ohio (by Frederick L. Smith, administrator), assignors to Owens-Illinois, Inc., Toledo, Ohio

Division of Ser. No. 431,211, Jan. 7, 1974. This application June 18, 1975, Ser. No. 589,485
Int. Cl.² C03C 3/22; H01L 21/223, 21/383
U.S. Cl. 106—39.6 3 Claims

1. A glass-ceramic dopant host body for vapor phase transport of B_2O_3 at elevated temperatures at which said body is rigid and dimensionally stable, the body being substantially free of alkali metal oxide and impurities which exhibit high vapor pressure at 900° – 1200° C, and being prepared by the thermal in situ crystallization of a thermally crystallizable alumino borosilicate glass consisting essentially of:

Component	Mole %
SiO_2	2–50
Al_2O_3	15–36
B_2O_3	10–50
MgO	15–36.

MgO and Al_2O_3 being in equimolar proportions.

3,997,352

MICA-SPODUMENE GLASS-CERAMIC ARTICLES

George H. Beall, Big Flats, N.Y., assignor to Corning Glass Works, Corning, N.Y.

Filed Sept. 29, 1975, Ser. No. 617,250
Int. Cl.[2] C03C 3/22, 3/04
U.S. Cl. 106—39.7 4 Claims

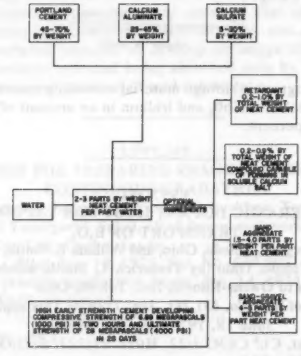
1. A glass-ceramic article exhibiting good machineability and a coefficient of thermal expansion (25°–500° C.) less than about 50×10^{-7}/° C. consisting essentially of interlocking plates of fluormica crystals and very fine-grained beta-spodumene solid solution crystals dispersed within a glassy matrix, said fluormica crystals comprising at least 50% of the total crystallization and having a grain size of at least 3 microns with a crystalline aspect ratio of at least 4:1, and said beta-spodumene solid solution crystals comprising at least 25% of the total crystallization and having a grain size less than about one micron, the sum of said crystals constituting at least 70% by volume of the article and being formed through the crystallization in situ of a glass body consisting essentially, by weight on the oxide basis, of about 3–30% R_2O + RO, wherein R_2O consists of 0–10% K_2O and/or Na_2O, and RO consists of 0–25% SrO and/or BaO, 1–5% Li_2O, 8–25% MgO, 10–25% Al_2O_3, 35–65% SiO_2, and 3–12% F.

3,997,353

HIGH EARLY STRENGTH CEMENT

James Chervenka, Jr., Kingsville, Tex., and Raymond P. Heilich, Mehlville, Mo., assignors to Aluminum Company of America, Pittsburgh, Pa.

Continuation-in-part of Ser. No. 515,909, Oct. 18, 1974, abandoned. This application Aug. 8, 1975, Ser. No. 603,011
Int. Cl.[2] C04B 7/02, 7/32, 11/00
U.S. Cl. 106—89 11 Claims


PORTLAND CEMENT
45–70% BY WEIGHT
CALCIUM ALUMINATE
25–45% BY WEIGHT
CALCIUM SULFATE
5–20% BY WEIGHT
RETARDANT 0.2–0.5% BY TOTAL WEIGHT OF NEAT CEMENT
0.2–0.5% BY TOTAL WEIGHT OF NEAT CEMENT OF SODIUM GLUCONATE OR TARTARIC OR SOLUBLE SALICYLIC SALTS
WATER
2–3 PARTS BY WEIGHT NEAT CEMENT PER PART WATER
OPTIONAL INGREDIENTS
SAND AGGREGATE (2–4.0 PARTS BY WEIGHT PER PART NEAT CEMENT
SAND-GRAVEL AGGREGATE (2–4.0 PARTS BY WEIGHT PER PART NEAT CEMENT
HIGH EARLY STRENGTH CEMENT DEVELOPING COMPRESSIVE STRENGTH OF 6.89 MEGAPASCALS (1000 PSI) IN TWO HOURS AND ULTIMATE STRENGTH OF 28 MEGAPASCALS (4000 PSI) IN 28 DAYS

1. A cementitious mixture capable of curing to exhibit both high early strength and good ultimate strength and containing as essential ingredients:

45 to 70% by weight portland cement;

25 to 45% by weight calcium aluminate;

5 to 20% by weight calcium sulfate;

said cementitious mixture being further characterized by a dimensional stability upon curing of less than about 0.05% shrinkage and less than about 0.2% expansion.

10. A cementitious mixture capable of curing to high early strength of at least about 6.89 mega Pascals in 2 hours and an ultimate strength of at least 28 mega Pascals in 28 days with a dimensional stability of less than about 0.05% shrinkage and less than about 0.2% expansion containing as essential ingredients: 50 to 60% by weight of a portland cement containing 28–63% by weight tricalcium silicate, 10–49% by weight dicalcium silicate, 1–14% by weight tricalcium aluminate, 4–15% by weight tetracalcium aluminoferrite, and not more than 2% by weight free calcium oxide; 30 to 40% by weight calcium aluminate; 7 to 15% by weight calcium sulfate; and 0.2 to 1.0% by weight of a retardant selected from the class consisting of soluble salts of organic acids.

3,997,354

BITUMINOUS BINDER COMPOSITIONS

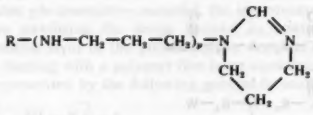
Pierre Pivette, Sucy-en-Brie, and Philippe Hilicour, Paris, both of France, assignors to Pierrefitte-Auby, Paris, France

Filed Jan. 29, 1975, Ser. No. 545,224
Claims priority, application France, Jan. 31, 1974, 74.03161
Int. Cl.[2] C08J 3/00; C08K 5/17, 5/34; C08L 95/00
U.S. Cl. 106—273 N 5 Claims

1. A bituminous binder composition comprising a bituminous substance and 0.05 to 2 % by weight of a mixture of polynitrogenous compounds obtained by reacting polyalkylene polyamines having the general structure:

$$R—NH\ (CH_2—CH_2—CH_2—NH)_n—H$$

with formic acid while removing the reaction water, said mixture of polynitrogenous compounds having as the main component a tetrahydropyrimidine substituted on a nitrogen by a long linear chain comprising one or more amine groups having the general structure:



wherein R is a saturated or unsaturated linear hydrocarbon comprising 8 to 22 carbon atoms, n is an integer from 2 to 5 and p is an integer equal to $(n-1)$.

3,997,355

SULFUR COMPOSITION

Lawrence E. Santucci, San Anselmo; Robert W. Campbell, Lafayette, and Gar Lok Woo, Tiburon, all of Calif., assignors to Chevron Research Company, San Francisco, Calif.

Filed Mar. 18, 1974, Ser. No. 452,490
Int. Cl.[2] C08L 95/00
U.S. Cl. 106—275 10 Claims

1. A sulfur-based aggregate-asphalt composition prepared by a process comprising mixing aggregate with molten asphalt and a molten sulfur system, wherein the sulfur system is prepared by a method comprising heating sulfur at liquid molten sulfur temperatures with a sulfur plasticizer to thereby plasticize the sulfur, and wherein the amount of the sulfur system in the composition is between 1¼ and 25 parts sulfur system per 1 part asphalt, and wherein the sulfur system comprises 50 to 97 weight percent sulfur.

3,997,356

REINFORCING ADDITIVE

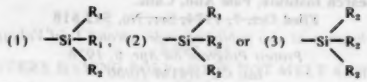
Friedrich Thurn, Bruhl; Kurt Burmester, Overath-Steinenbruck; Johannes Pochert, Walberberg, and Siegfried Wolff, Bruhl, all of Germany, assignors to Deutsche Gold- und Silber-Scheideanstalt vormals Roessler, Frankfurt, Germany

Division of Ser. No. 415,176, Nov. 12, 1973, Pat. No. 3,876,489, and a continuation-in-part of Ser. No. 277,043, Aug. 1, 1972, Pat. No. 3,842,111. This application Dec. 4, 1974, Ser. No. 529,568
Int. Cl.[2] C09C 1/28
U.S. Cl. 106—288 Q 20 Claims

1. A composition suitable for use in a rubber mixture comprising 0.1 to 50 parts of an organosilane compound having the formula

$$Z - alk - S_n - alk - Z,$$

in which Z is



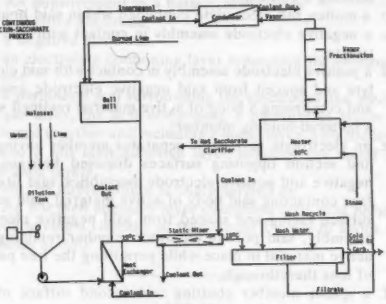
wherein R_1 is alkyl of 1 to 4 carbon atoms, cyclohexyl or phenyl and R_2 is alkoxy of 1 to 8 carbon atoms, cycloalkoxy with 5 to 8 carbon atoms or alkylmercapto with 1 to 8 carbon atoms, alk is a divalent hydrocarbon of 1 to 18 carbon atoms an n is a number of 3.0 to 6.0, and 10 to 250 parts of a siliceous filler.

3,997,357

CONTINUOUS PROCESS FOR THE RECOVERY OF SUGAR FROM MOLASSES

Karlheinz W. R. Schoenrock; Chia-Lung Hsieh, and Hugh G. Rounds, all of Ogden, Utah, assignors to The Amalgamated Sugar Company, Ogden, Utah

Filed Oct. 17, 1975, Ser. No. 623,410
Int. Cl.² C13J *1/04*
U.S. Cl. 127—47 **6 Claims**



1. A continuous process for the precipitation and recovery of calcium saccharate from molasses which comprises treating an aqueous molasses solution containing 5 – 20% by weight of sugar with 15 – 50% of the active CaO required to react with the sugar in the molasses, the active CaO being added to the aqueous molasses solution in the form of burned lime, hydrated lime or milk of lime, cooling the molasses/lime mixture to below 20° C., injecting into a continuous first stream of this molasses/lime mixture a second stream of a slurry of ground lime in an organic liquid carrier, said carrier being inert to CaO and to sugar, said ground lime slurry injected being sufficient to provide 40 – 70% of the active CaO required to react with the sugar in the molasses, passing the combined streams through a motionless, static mixer to obtain homogeneity of the cool mixture containing the resulting precipitated calcium saccharate, maintaining the temperature below 20° C. throughout, filtering the cool mixture containing the precipitated calcium saccharate and washing the resulting cold filter cake.

3,997,358

CLEANING PROCESS FOR SEMICONDUCTOR DIE

Myron Lewis Taylor, Phoenix, Ariz., assignor to Motorola, Inc., Chicago, Ill.

Filed Feb. 19, 1976, Ser. No. 659,304
Int. Cl.² B08B *7/00*
U.S. Cl. 134—7 **4 Claims**

1. A method for removing slag and scribing debris from the surfaces of laser scribed semiconductor die comprising the steps of:

a. placing said die and a cleaning aggregate together in a cylindrical wire mesh container of 1½ to 2 inch diameter; and

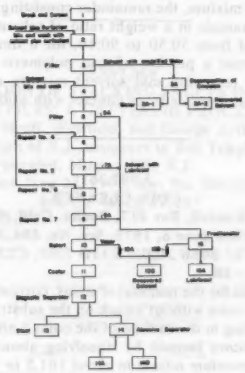
b. tumbling said die and said cleaning aggregate together by rotating said container at 30 revolutions per minute for from 8 minutes to 15 minutes to remove the slag and scribing debris from the die, the wire mesh being sized so as to retain the die and aggregate inside the cylinder, while allowing the removed slag and scribing debris to fall through the wire mesh of the cylinder.

3,997,359

RECLAMATION OF COMPONENTS FROM GRINDING SWARF

Joseph Daniel Dankoff, P.O. Box 19, R.D. 5, and David Kent Snyder, 1167 Ridgeview Drive, both of Latrobe, Pa. 15650

Continuation-in-part of Ser. No. 304,385, Nov. 7, 1972, Pat. No. 3,865,629. This application Oct. 2, 1974, Ser. No. 511,198
The portion of the term of this patent subsequent to Feb. 11, 1992, has been disclaimed.
Int. Cl.² B08B *3/10*
U.S. Cl. 134—10 **8 Claims**



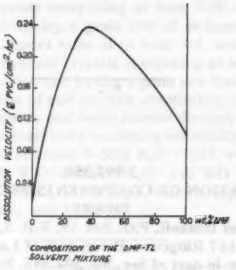
1. In the process of extracting one or more components of grinding swarf wherein a coolant-lubricant has been used in generating the swarf and in which the swarf, if necessary is first ground and screened, and then first washed with a solvent to remove water from the swarf and the solvent combined with water removed and after removal of the water the swarf is then washed at least once in a lubricant removing solvent selected from the group consisting of liquid hydrocarbons and chlorinated liquid hydrocarbons, separating the solvent with dissolved lubricant from the swarf, followed by heating the now washed swarf in a closed environment such that air is substantially eliminated to a temperature sufficiently high enough to remove from the swarf as vapor residual solvent and remaining traces of lubricant, the invention which comprises using as a solvent for first effecting the removal of the water from the swarf a lubricant removing solvent selected from the group consisting of liquid hydrocarbons and chlorinated liquid hydrocarbons combined with a synthetic surfactant.

3,997,360

PROCESS FOR CLEANING VINYL CHLORIDE POLYMERIZATION REACTORS

Francesco Testa, Bresso (Milan), and Antonio Bigliani, Saronno (Varese), both of Italy, assignors to Societa Italiana Resine S.I.R. S.p.A., Milan, Italy

Filed Aug. 11, 1975, Ser. No. 603,395
Claims priority, application Italy, Sept. 10, 1974, 27118/74
Int. Cl.² B08B 3/08
U.S. Cl. 134—22 R 6 Claims



1. In a method for cleansing surfaces of equipment used for the polymerization of vinyl chloride by removing polymeric deposits therefrom by contact with a solvent, the improvement which comprises contacting polymeric deposits formed on said surfaces at a temperature of at least 60° C with a solvent mixture containing water in amounts up to 7% by weight of the mixture, the remainder consisting of toluene and dimethylformamide in a weight ratio of toluene to dimethylformamide of from 50:50 to 90:10, for a time sufficient to dissolve at least a portion of said polymeric deposits, and subsequently removing said solvent mixture containing dissolved polymeric solids from contact with said surfaces.

3,997,361

COIN CLEANER

Earl Wesley Kendall, Box 417, Bonita, Calif. 92002

Filed June 6, 1975, Ser. No. 584,397
Int. Cl.² B08B 3/00; C11D 7/08; C23G 1/02
U.S. Cl. 134—28 7 Claims

5. A process for the removal of stains, corrosion and encrustations from coins without attack on the substrate metal comprising applying to the surface of the coins a nitric-phosphoric acid composition formed by dissolving about 1.08 to 10.8 grams of ammonium nitrate in about 161.5 to 169.2 grams of orthophosphoric acid (85%), and maintaining the coins in contact with said composition operated at ambient temperature of the order of 15° C to 38° C for a period of time of the order of ½ to 5 minutes.

3,997,362

POLYHALIDE HIGH ENERGY DENSITY CELLS

Daniel J. Eustace, Chatham, and Bhaskara M. L. Rao, Fanwood, both of N.J., assignors to Exxon Research and Engineering Company, Linden, N.J.

Filed Oct. 14, 1975, Ser. No. 621,761
Int. Cl.² H01M 35/02
U.S. Cl. 429—194 9 Claims

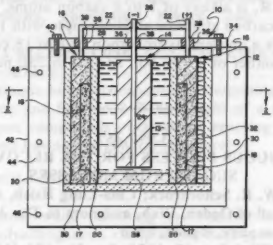
1. An electrochemical cell comprising an anode containing at least one alkali metal as the anode-active material, a cathode, an oxidant of at least one quaternary ammonium polyhalide and an electrolyte of an aprotic solvent having an ionizable salt of at least one alkali metal dissolved therein.

3,997,363

MODULAR ELECTRICAL ENERGY STORAGE DEVICE

Richard C. Saunders, Simi, Calif., assignor to Electric Power Research Institute, Palo Alto, Calif.

Filed Oct. 7, 1974, Ser. No. 512,818
Disclosure was also published under second Trial Voluntary Protest Program on Apr. 6, 1976
Int. Cl.² H01M 10/00
U.S. Cl. 429—66 16 Claims



1. An electrical energy storage device comprising:
a. a housing having side and end walls and a bottom member forming a container;
b. a molten salt electrolyte contained within said housing;
c. a negative electrode assembly in contact with said electrolyte;
d. a positive electrode assembly in contact with said electrolyte and spaced from said negative electrode assembly and comprising a body of active material retained within a material-holding member;
e. an electrolyte-permeable separator member having first and second opposing surfaces disposed between said negative and positive electrode assemblies, said first surface contacting said body of active material, said second surface facing and spaced from said negative electrode assembly, said porous separator member retaining said active material in place while permitting the free passage of ions therethrough;
f. a spacer member abutting said second surface of said separator member; and
g. a resilient body of at least partially compressed carbon or graphite fibers contained within said housing adjacent said positive electrode assembly for resiliently urging said spacer and separator members into contact with one another to maintain at least said members in substantially fixed position.

3,997,364

NICKEL ACTIVATION PROCESS

Ian P. Gutridge, Staffs, England, assignor to The International Nickel Company, Inc., New York, N.Y.

Filed Nov. 4, 1974, Ser. No. 520,258
Claims priority, application United Kingdom, Nov. 13, 1973, 52658/73
Int. Cl.² H01M 4/16
U.S. Cl. 204—2.1 11 Claims

1. A process for depositing electrochemically active mass on an impervious nickel substrate which comprises anodically treating the substrate, at an anodic current density of 0.10 – 1000mA/cm², in an aqueous electrolyte which is formed by the addition of ammonia to an aqueous solution of nickel nitrate and ammonium nitrate and in which the ratio of ammonia to nickel (gram molecules to gram ions) is about 0.1:1 to about 3:1 and the ratio of the molar concentration of ammonium nitrate to the molar concentration of nickel nitrate is about 0.1:1 to about 3:1, to provide a deposit of porous beta nickel hydrate adherent to the substrate and thereafter cathodically treating the thus anodically treated substrate in an acid electrolyte containing nickel ions and reducible ions the

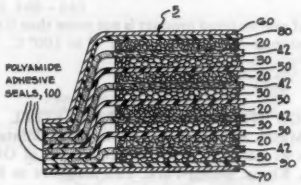
redox potential of which is more positive than the discharge potential of nickel ions to deposit nickel hydroxide in the pores of said beta nickel hydrate deposit.

3,997,365

BATTERY HAVING POLYAMIDE HOT MELT ADHESIVE SEAL

Ralph H. Feldhake, Verona, Wis., assignor to ESB Incorporated, Philadelphia, Pa.

Continuation-in-part of Ser. No. 258,751, June 1, 1972, abandoned. This application Dec. 10, 1973, Ser. No. 424,414
Int. Cl.² H01M 2/08
U.S. Cl. 429—185 12 Claims



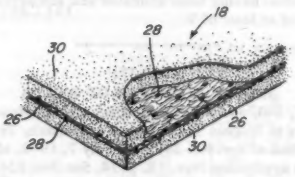
1. An improvement in a battery comprising
a. a positive electrode,
b. a negative electrode,
c. an electrolyte containing layer separating the electrodes, and
d. a peripheral seal surrounding the electrodes and electrolyte layer, the seal comprising a plurality of layers adhered together and including a metal layer, a plastic layer, and a hot melt adhesive layer between the metal and plastic layers,
wherein the improvement is characterized by
e. the hot melt adhesive layer comprises fatty acid polyamide having a viscosity of from about 1 poise to about 100 poise at 350° F.

3,997,366

BATTERY SEPARATORS

Charles Davis, Jr., Warrensville Heights, Ohio, assignor to Union Carbide Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 290,815, Sept. 21, 1972, abandoned. This application Aug. 23, 1974, Ser. No. 499,934
The portion of the term of this patent subsequent to Sept. 16, 1992, has been disclaimed.
Int. Cl.² H01M 2/16
U.S. Cl. 429—144 10 Claims



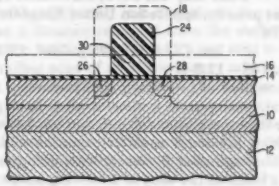
1. A battery separator comprising a layer of electrolyte-immobilizing partially cross-linked polyacrylamide
and a carrier for said layer composed of a thin, nonwoven, bonded glass fiber web, containing glass fibers having a diameter of 2 to 8 microns and an individual length of one sixteenth to one half inch, said separator being about 2 to 7 mils in average overall thickness,
and said carrier being about 1 to 3 mils in thickness.

3,997,367

METHOD FOR MAKING TRANSISTORS

Leopoldo Dy Yau, New Providence, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Nov. 20, 1975, Ser. No. 633,602
Int. Cl.² H01L 21/265
U.S. Cl. 148—1.5 12 Claims



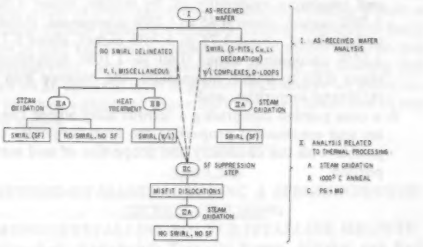
1. A method for making a semiconductor device comprising the steps of
forming a prescribed resist pattern on a semiconductor body of one conductivity type,
establishing regions of a specified conductivity type in portions of said body not masked by said resist pattern whereby said regions are spaced apart laterally in said body by a distance approximately equal to the width of said resist pattern,
and trimming said resist pattern by a predetermined amount to reduce the width thereof thereby to provide a mask member for subsequent processing of said device.

3,997,368

ELIMINATION OF STACKING FAULTS IN SILICON DEVICES: A GETTERING PROCESS

Pierre Marc Pétroff, Westfield, and George Arthur Rozgonyi, Chatham, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed June 24, 1975, Ser. No. 589,945
Int. Cl.² H01L 21/265
U.S. Cl. 148—1.5 13 Claims



1. In a method of manufacturing semiconductor devices from silicon wafers wherein, before performing any high temperature processing steps which tend to generate stacking faults in the devices, lattice distortion is introduced into the back surface of the wafer and then processing steps are performed directed toward the completion of the device, a process characterized in that
1. the introduction of lattice distortion includes forming on the back surface a stressed layer, and
2. the layer is annealed for a time and at a temperature effective to cause stacking fault nucleation sites to diffuse to a region near to the back surface, thereby suppressing the formation of stacking faults in the device.

3,997,369

PRODUCTION OF METALLIC ARTICLES

Roger Grimes, Amersham; Kenneth John Gardner, Chalfont St. Peter; Michael James Stowell, Saffron Walden, and Brian Michael Watts, Haverhill, all of England, assignors to the British Aluminium Company Limited, London and T. I. (Group Services) Limited, Birmingham, both of England

Filed May 12, 1975, Ser. No. 576,317

Claims priority, application United Kingdom, May 13, 1974, 21061/74

Int. Cl.[2] C22F *1/00, 1/04, 1/08*

U.S. Cl. 148—11.5 R 18 Claims

1. A method of producing simultaneously a fine recrystallised grain structure in a metallic alloy having a composition suitable for superplastic deformation but having a grain structure which precludes such deformation and of forming an article from said alloy by superplastic deformation comprising raising a blank of the alloy to a forming temperature, applying a force to the blank at said temperature to deform the blank non-superplastically and induce dynamic strain recrystallisation and continuing the application of said force so that said fine recrystallised grain structure is progressively developed and the partly formed blank is superplastically deformed to form the article.

3,997,370

METHOD OF HOT REDUCING FERROUS AND FERROUS ALLOY PRODUCTS WITH COMPOSITE MARTENSITIC NODULAR CAST CHILL IRON ROLLS

Paul J. Horvath, Jr., Whitehall, and John A. Gibbon, Center Valley, both of Pa., assignors to Bethlehem Steel Corporation, Bethlehem, Pa.

Filed Nov. 17, 1975, Ser. No. 632,872

Int. Cl.[2] C22F

U.S. Cl. 148—12 R 5 Claims

1. In a process of hot rolling ferrous and ferrous alloy products which products are heated to temperatures in excess of 1900° F and subsequently rolled at temperatures between about 900° F and the temperature of such initial heating, the improvement comprising in combination therewith the use of a thermal crack resistant composite work roll to effect said rolling, said composite work roll characterized by

1. a surface portion having a hardness of at least 76 Shore-C and consisting essentially of, by weight, about 3.00 to 3.70% carbon, about 0.35 to 1.25% manganese, about 1.0 to 2.0 silicon, about 3.75 to 5.75% nickel, about 0.75 to 1.35% chromium, about 0.40 to 1.10% molybdenum, about 0.03 to 0.08% magnesium, the balance iron and incidental impurities, and
2. a core portion comprising a ferrous alloy whose chemistry and mechanical properties are metallurgically compatible with the chemistry and properties of said surface portion.

3,997,371

PERMANENT MAGNET

Masaaki Tokunaga, Kumagaya, and Kazuo Yamakawa, Hoya, both of Japan, assignors to Hitachi Metals, Ltd., Japan

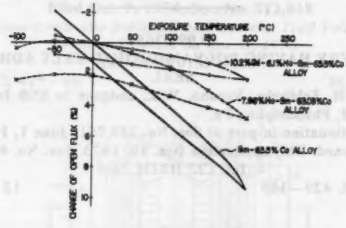
Filed Nov. 4, 1974, Ser. No. 520,904

Claims priority, application Japan, Nov. 12, 1973, 48-126250

Int. Cl.[2] H01F *1/04*

U.S. Cl. 148—31.57 18 Claims

1. A permanent magnet made of a sintered product consisting essentially of, in weight percent, (a) at least one of 3 to 18% Ho, 2 to 17% Er, 2 to 15% Dy and 2 to 15% Tb, (b) Sm, and (c) the balance consisting essentially of Co, wherein the amount of Sm is such that the total amount of rare earth elements including Sm in said product is 23 to 43%, and the absolute value of the reversible magnetization temperature



coefficient of said sintered product is not more than 0.03%/° C in the temperature range of from −50° C to 100° C.

3,997,372

HIGH STRENGTH LOW ALLOY STEEL

Stephen J. Matas, Independence; Raymond E. Mintus, Warren; John B. Ballance, Bedford Heights, all of Ohio, and George J. Klems, Bethel Park, Pa., assignors to Republic Steel Corporation, Cleveland, Ohio

Continuation of Ser. No. 475,887, June 3, 1974, abandoned. This application June 12, 1975, Ser. No. 586,197

Int. Cl.[2] C22C *38/12*

U.S. Cl. 148—36 11 Claims

1. A high strength steel product produced by hot rolling, and having yield strength of at least 80 ksi longitudinally and transversely, said steel consisting essentially of 0.05 to 0.10% C, 0.5 to 1.65% Mn, 0.2 to 0.8% Si, 0.08 to 0.15% Cb, 0.05 to 0.15% V, 0 to 0.2% of sulfide shape control agent, and from 0 to the following maximum percentages of the following elements, 0.03 max. P, 0.03 max. S, 0.03 max. N, 0.09 max. Al, balance iron and incidental elements.

3,997,373

FERRITIC STAINLESS STEEL HAVING HIGH ANISOTROPY

Richard Kazeva, New Kensington, Pa., assignor to Allegheny Ludlum Industries, Inc., Pittsburgh, Pa.

Division of Ser. No. 540,366, Jan. 13, 1975, Pat. No. 3,936,323. This application Oct. 1, 1975, Ser. No. 618,703

Int. Cl.[2] C22C *38/26*

U.S. Cl. 148—37 2 Claims

1. A ferritic stainless steel having high anisotropy and being suitable for deep drawing, consisting essentially of, by weight, from 12 – 14% chromium, from 0.2 – 1.0% columbium, and not more than 0.75% total of carbon, nitrogen, silicon, manganese, molybdenum, nickel, and copper; balance, essentially iron, said steel having been annealed and subjected to a cold reduction of at least 65%.

3,997,374

HEAT TREATMENT OF WELDS

Herbert C. Dill, and Allen E. Wisler, both of Houston, Tex., assignors to Hughes Tool Company, Houston, Tex.

Continuation of Ser. No. 269,648, July 7, 1972, abandoned. This application Nov. 18, 1974, Ser. No. 524,919

Int. Cl.[2] C21D *1/66, 9/50*

U.S. Cl. 148—127 9 Claims

1. The method of welding and heat treating a pipe and a connector, the method comprising the steps of:

welding a steel connector to one end of a steel pipe;

cooling the weld below the transformation temperature of said steel pipe and connector;

heating the weld and heat affected zone to a temperature range of about 175° to 1800° F;

quenching the weld and heat affected zone by forcing a

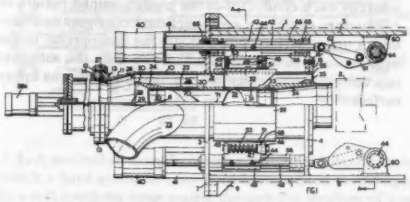
gaseous fluid across the zone simultaneously on the interior and exterior of said pipe and connection to harden them across their cross-section without cracking and to increase their overall strength to a value matching that of the pipe; and

tempering the weld and heat affected zone.

3,997,375
STEEL HARDENING METHOD

Louis E. Franceschina; Fred Haromy, both of Sault Ste. Marie, and Frederick William Kruppert, Goulais River, all of Canada, assignors to The Algoma Steel Corporation, Limited, Sault Ste. Marie, Canada

Division of Ser. No. 379,277, July 16, 1973, Pat. No. 3,877,685. This application Dec. 24, 1974, Ser. No. 536,135
Int. Cl.² C21D *9/14*
U.S. Cl. 148—143 4 Claims



1. A method of hardening an elongated steel pipe by quenching with a liquid cooling medium comprising:

a. supporting a hot pipe to be hardened in a container in predetermined relationship to a first inlet means;

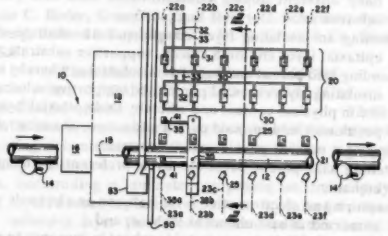
b. flowing liquid cooling medium directly from the first inlet means longitudinally through the inside of the pipe while at the same time passing a flow of the cooling medium in the same direction over the outside of the pipe;

c. and varying the rate of flow of liquid cooling medium passing through the inside of the pipe relative to the rate of flow of cooling medium flowing over the outside of the pipe to control the rate of cooling of the inside surface of the pipe relative to the rate of cooling of the outside surface of the pipe to produce a substantially uniform surface hardness on the inner and outer surfaces of the pipe regardless of the diameter of the pipe being hardened.

3,997,376
SPRAY MIST COOLING METHOD

Klaus H. Hemsath, Sylvania, Ohio, and Frank J. Vereecke, Palmyra, Mich., assignors to Midland-Ross Corporation, Cleveland, Ohio

Filed June 19, 1974, Ser. No. 480,920
Int. Cl.² C21D *1/18*
U.S. Cl. 148—143 5 Claims



1. A method for cooling a heated workpiece traveling through a cooling arrangement comprising the steps of:

directing a plurality of fan type atomizing spray mists carrying atomized water particles of a size sufficient to float in air in an array surrounding said workpiece at equally spaced distances therefrom;

spacing a plurality of said arrays in axial increments perpendicular to said workpiece;

interacting the side edge of each spray mist in each array with the side edge of an adjacent spray mist in that array at a distance removed from the surface of the workpiece to produce turbulent flows generally in a first plane;

interacting at a distance removed from the surface of the workpiece the leading edge of each spray mist in an array with the trailing edge of an aligned spray mist in an adjacent array to produce turbulent flow generally in a second direction;

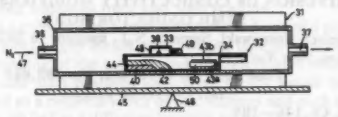
interacting said turbulent flows to completely and uniformly envelop said workpiece within said cooling arrangement in an envelope by a turbulently flowing spray mist; and

evaporating said spray mist within said envelope by the heat from said workpiece before said spray mist can come into actual physical contact with said workpiece thereby providing a controlled rate of cooling of said workpiece without thermal deformation of said workpiece.

3,997,377
METHOD OF MAKING A LIQUID PHASE EPITAXIAL-LAYERS OF GALLIUM PHOSPHIDE ON MULTIPLE WAFERS

Nobuyuki Izawa, Sagamihara, and Kazuya Tanabe, Zama, both of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Feb. 4, 1975, Ser. No. 547,050
Claims priority, application Japan, Feb. 7, 1974, 49-15724
Int. Cl.² H01L *21/208, 21/225*
U.S. Cl. 148—172 12 Claims



1. A method of making a liquid phase epitaxial layer of gallium phosphide comprising the steps of providing at least two horizontal semiconductor wafers of one conductivity, one of said wafers being substantially parallel to and above the other wafer at a predetermined distance, providing a melt of gallium-gallium phosphide solution, causing said melt to freely flow at least between said semiconductor wafers to fill an area therebetween, and simultaneously growing by cooling said melt on an epitaxial layer of greater thickness on an upper one of said two wafers and lesser thickness on a lower one of said two wafers.

3,997,378
METHOD OF MANUFACTURING A SEMICONDUCTOR DEVICE UTILIZING MONOCRYSTALLINE-POLYCRYSTALLINE GROWTH

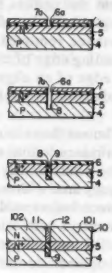
Tadao Kaji, Kokubunji; Tsuneaki Kamei, Mitaka, and Keiji Miyamoto, Hinode, all of Japan, assignors to Hitachi, Ltd., Japan

Filed Oct. 17, 1975, Ser. No. 623,476
Claims priority, application Japan, Oct. 18, 1974, 49-119357
Int. Cl.² H01L *21/20, 21/76*
U.S. Cl. 148—174 6 Claims

1. A method of manufacturing a semiconductor device comprising the steps of:

a. selectively removing semiconductor material from the principal surface of a semiconductor substrate made up of at least one semiconductor layer of first conductivity type and the conductivity type of the semiconductor

material of the substrate therebeneath is a second conductivity type, opposite said first conductivity type, so that a PN junction is formed between said one semiconductor layer and the semiconductor material of the substrate therebeneath, to form a groove in said substrate which extends to a prescribed depth in said substrate, said groove extending beyond said PN junction;



b. filling said groove with a first layer of insulator material; and

c. forming a second semiconductor layer over the entire surface of said one semiconductor layer and said insulator material filling said groove, so as to form polycrystalline semiconductor material on said insulator material and monocrystalline semiconductor material on the adjoining said one semiconductor layer.

3,997,379

DIFFUSION OF CONDUCTIVITY MODIFIERS INTO A SEMICONDUCTOR BODY

Wojciech Rosnowski, Summit, N.J., assignor to RCA Corporation, New York, N.Y.

Filed June 20, 1975, Ser. No. 588,863

Int. Cl.² H01L *21/223*

U.S. Cl. 148—189 **3 Claims**

1. A method of introducing conductivity modifiers into a semiconductor body which comprises:

forming, at a first temperature, in a diffusion tube having one end sealed and having a vacuum system connected to the other end, a source of said conductivity modifiers, said source being an aluminum or gallium alloy of silicon, said diffusion tube further containing said semiconductor body; and

heating said diffusion tube, to a second temperature, said second temperature being comparatively higher than said first temperature, at which said conductivity modifiers are emitted from said source and diffuse into said semiconductor body.

3,997,380

METHOD OF ENGRAVING A CONDUCTIVE LAYER

Yves H. Thorn, La Celle Saint-Cloud, and Michel Sineau, Sartrouville, both of France, assignors to Compagnie Internationale pour l'Informatique, Louveciennes, France

Continuation of Ser. No. 124,067, March 15, 1971, abandoned. This application Feb. 12, 1973, Ser. No. 331,542

Claims priority, application France, Apr. 17, 1970, 70.13995

Int. Cl.² B05D *5/12*; **H01L** *21/312*

U.S. Cl. 156—3 **2 Claims**

1. In the manufacture of multi-layer thin film circuits made of a progressively formed stack of predetermined patterns of etched conductors, each pattern bonded to an insulating substrate, a method of making one layer of the stack comprising:

a. providing a continuous electrically conductive layer of about 3 microns thickness bonded to an insulating substrate;

b. depositing over said layer a continuous temporary thin flush film having a thickness of about ¼ micron and being of an electrically conductive material electronegative with respect to said layer;

c. etching said flush through a resist mask with an acid etchant which will not etch said layer;

d. next etching said layer through the etched portions of said flush with a different etchant which will not etch said film; and

e. thereafter removing the remaining portions of said film whereby each conductor in the predetermined pattern of conductors exhibits a cross-sectional configuration having an upper surface substantially flat and parallel to the substrate and side surfaces which rise from the substrate in a convex curve which merges smoothly into the upper surface.

3,997,381

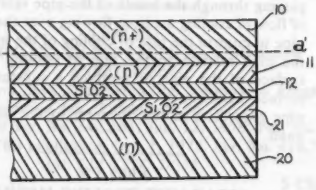
METHOD OF MANUFACTURE OF AN EPITAXIAL SEMICONDUCTOR LAYER ON AN INSULATING SUBSTRATE

David R. Wanlass, Mountain View, Calif., assignor to Intel Corporation, Santa Clara, Calif.

Filed Jan. 10, 1975, Ser. No. 540,010

Int. Cl.² H01L *7/50*

U.S. Cl. 156—3 **5 Claims**



1. A method for fabricating a semiconductor wafer comprising:

starting with a silicon monocrystalline, parent substrate;

forming an epitaxial, silicon, monocrystalline layer upon said parent substrate, said epitaxial layer having substantially different doping concentrations than said parent substrate;

forming an insulating layer on said parent substrate with epitaxial layer and on a silicon, supportive substrate;

bonding said parent and supportive substrates whereby said insulating layers on said parent and supportive substrates are in physical contact and whereby said epitaxial layer is positioned between said parent and supportive substrates;

lapping a portion of said parent substrate;

etching said parent substrate by a preferential chemical etchant;

measuring an electromotive force between an electrode pair immersed in said chemical etchant; and

adding an oxidizing agent to said etchant in response to said measuring of electromotive force to control the etching characteristics of said etchant and to terminate said etching when removal is substantially complete.

3,997,382

METHOD OF AND APPARATUS FOR MANUFACTURING REINFORCED FLEXIBLE TUBES

Kenichi Tanaka, Musashino, Japan, assignor to Kakuichi Mfg. Co., Ltd., Ueda, Japan

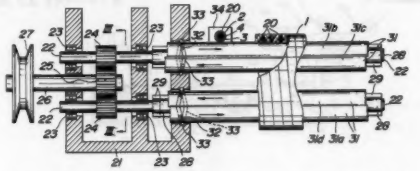
Continuation of Ser. No. 335,797, Feb. 26, 1973, abandoned. This application Apr. 15, 1974, Ser. No. 460,972

Claims priority, application Japan, Feb. 29, 1972, 47-20198; May 25, 1972, 47-51946

The portion of the term of this patent subsequent to Aug. 10, 1993, has been disclaimed.

Int. Cl.² B65H *81/00*

U.S. Cl. 156—167 10 Claims



1. A method of manufacturing a reinforced flexible tube in which a hard synthetic resin core is embedded in and applied to a soft synthetic resin matrix through the medium of a semi-hard synthetic resin adhesive layer, comprising: simultaneously extruding hard synthetic resin material and semi-hard synthetic resin material to cover said hard synthetic resin material with said semi-hard synthetic resin material to form a first composite elongate element, preheating said first elongate element, extruding soft synthetic resin material around said first elongate element to form a second composite elongate element, continuously tangentially supplying said second composite elongated element onto one of a plurality of at least three parallel, axially segmented rotary shafts arranged to be internally tangential to a tube to be manufactured thereon, rotating each rotary shaft about its own axis, and moving in a forward direction at least one segment of each rotary shaft which is positioned internally tangential to said tube by a given pitch distance and simultaneously moving in a backward direction at least one segment of each rotary shaft which is positioned non-tangential to said tube by the same pitch distance, thereby spirally winding said second composite element in successive turns around said rotary shafts, said successive turns being in contact side by side, fusing said successive turns together thereby forming in said forward direction said reinforced flexible tube.

3,997,383

CROSS-LINKED AMIDE/OLEFIN POLYMERIC LAMINATES

Anne C. Bieler, Greenville, and Henry G. Schirmer, Spartanburg, both of S.C., assignors to W. R. Grace & Co., Duncan, S.C.

Filed Mar. 10, 1975, Ser. No. 556,755

Int. Cl.² B32B *27/32, 27/34, 27/08, 31/28*

U.S. Cl. 156—244 12 Claims

1. A method of making a polymeric laminate capable of resisting delamination in elevated temperature media comprising the steps of:

a. coextruding a laminate comprising an amide polymer layer, a mono-alpha olefin polymer layer, and a polymeric adhesive layer therebetween, said adhesive being predominantly comprised of mono-alpha olefin units; and, subsequently,

b. cross-linking said coextruded laminate by ionizing radiation, said cross-linking being equivalent to a dosage level of at least 6 MR.

3,997,384

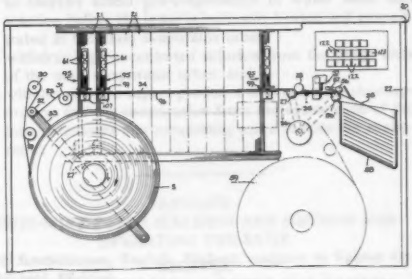
SYSTEM FOR MAKING COLOR-CODED INDEX TABS

Victor Kuring, 275 Short Hills Ave., Springfield, N.J. 07101; W. R. Smith-Vaniz, 14 Pasture Lane, Darien, Conn. 06820; Jay L. Carley, 186 Orchard Hill Lane, Fairfield, Conn. 06430; William P. Shine, 31 E. Dale Drive, Monroe, Conn. 06468, and Richard H. Darling, 10 Robert Court, Fairfield, Conn. 06430

Division of Ser. No. 225,265, Feb. 10, 1972, Pat. No. 3,801,408. This application Feb. 25, 1974, Ser. No. 445,458

Int. Cl.² B32B *31/04*

U.S. Cl. 156—269 16 Claims



1. A method of making color-coded index tabs comprising the steps of

moving a carrier tape through a predetermined path having a plurality of stations therein from a predetermined start position;

stopping the moving tape in said path at a plurality of predetermined distances from said start position;

applying a color-coded label from a selected one of a plurality of label supply means to the carrier tape in response to the stopping of the tape at each predetermined distance from said start position, each label supply means being located at a respective one of said stations and each label being applied at a different location on the tape to form a non-repeating pattern of color-coded labels on said tape; and

receiving the tape with the color-coded labels thereon at a point downstream of said start position.

3,997,385

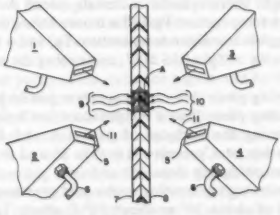
CLAMPING OF FILM-LIKE MATERIAL FOR RADIANT ENERGY WELDING

Richard F. Osborne, Mauldin, S.C., assignor to W. R. Grace & Co., Duncan, S.C.

Filed Aug. 18, 1975, Ser. No. 605,361

Int. Cl.² B29C *19/02, 17/00;* B32B *19/02*

U.S. Cl. 156—272 14 Claims



1. A method of clamping and welding sheets of thermoplastic material together with radiant energy comprising the steps of:

a. positioning two sheets of thermoplastic material in a vertically opposed, face-to-face relationship;

b. placing a pair of jets adjacent the outer surface of each of said sheets, each of said jets being slot-shaped and opposed to the other pair of said jets;
c. supplying a gas to said jets;
d. directing both jets in the same pair of jets so that gas emerging therefrom impinges on the same area of said outer surface of said sheets thereby pressing and clamping said sheets into contact in said area; and,
e. irradiating said clamped area with radiant energy to heat the material to its welding temperature thereby fusing said sheets together in their area of contact.

3,997,386

METHOD FOR BONDING THERMOPLASTIC HIGH MOLECULAR WEIGHT MATERIALS

Yoshiki Oshida, and Hiroaki Kita, both of Yokohama, Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 30, 1975, Ser. No. 573,333
Claims priority, application Japan, May 31, 1974, 49-60903
Int. Cl.[2] C09J *5/00;* B65C *9/25*
U.S. Cl. 156—306 6 Claims

2. A process for bonding together two pieces of high molecular weight thermoplastic materials each having substantially the same glass transition point, comprising the sequential steps of:
a. heating both pieces to a temperature just below their glass transition point at a rate of about 10° C/sec;
b. pressing the two surfaces to be joined together and maintaining said pressure through steps (a), (c) and (d);
c. continuing the heating at a rate of about 10° C/sec under pressure to a temperature of about 20° to about 50° C above the glass transition temperature of the thermoplastic materials;
d. allowing the thus-heated pieces to cool at a rate of about 5° C/sec to below the glass transition temperature under pressure
e. releasing said pressure and allowing the thus bonded pieces to cool to room temperature, thereby producing a bond having a joint tensile strength at least equal to the tensile strength of the individual thermoplastic pieces.

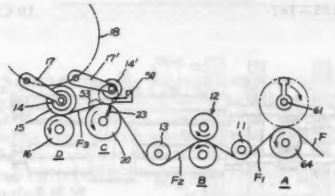
3. A process for bonding together two pieces of high molecular weight thermoplastic materials, piece A having a glass transition temperature Tg and a tensile strength S and piece B having a glass transition temperature Tg′ and a tensile strength S′, where Tg > Tg′ and S > S′, comprising the sequential steps of:
a. heating piece A to a temperature just below Tg;
b. heating piece B to a temperature just below Tg′;
c. pressing the surfaces of pieces A and B to be joined together at a pressure less than S′ and maintaining said pressure during steps (d) and (e);
d. continuing the heating under said pressure to a temperature of about 20° to about 50° C above Tg;
e. cooling the thus heated pieces to a temperature below Tg′;
f. releasing said pressure and allowing the thus-bonded pieces to cool to room temperature; thereby producing a bond between pieces A and B having a joint tensile strength at least equal to S

3,997,387

APPARATUS FOR APPLYING LEADING TIPS TO A CONTINUOUS SHEET MATERIAL AND CUTTING THE SAME

Toshiaki Yamaguchi; Katsunori Fujita; Keizo Narita, and Takashi Sunda, all of Kyoto, Japan, assignors to Nishimura Seisakusho Co., Ltd., Kyoto, Japan

Filed June 5, 1974, Ser. No. 476,671
Claims priority, application Japan, June 8, 1973, 48-65229
Int. Cl.[2] B65H *19/06, 19/26*
U.S. Cl. 156—519 9 Claims



1. An apparatus for applying leading tips to, slitting into strips, and cutting a continuous sheet of material, comprising:
means for continuously feeding said continuous sheet in the direction of its length at a constant speed, from a sheet material supplying position, through a leading tip applying position, a sheet slitting position and a slitted strip cutting position, to a slitted strip rewinding position, said sheet slitting position being between said leading tip applying position and said slitted strip cutting position;
tip applying means for intermittently applying and adhering leading tips to said continuous sheet of material substantially over the entire width of said continuous sheet at said leading tip applying position;
slitting means for slitting said continuous sheet with said leading tips adhered thereon into a plurality of slitted strips, at said sheet slitting position;
a rotatable cut drum along a part of which said slitted strips are fed, said cut drum being situated at said sheet material cutting position and having cutting means slidably mounted therein, said cutting means including a knife edge movable between a first position at which said knife edge extends beyond the periphery of said cut drum and a second position at which said knife edge is retracted within the periphery of said cut drum;
cam means for actuating said cutting means between said two positions at a predetermined rotary position of said cut drum within the angle range during which said slitted strips are in contact with the periphery of said cut drum, said cam means being movable between an operative position at which said cam means is engageable with said cutting means to move said cutting means to said first position and a non-operative position at which said cam means is disengaged from said cutting means to maintain said cutting means in said second position;
means for switching said cam means between said operative position and said non-operative position;
drive means for continuously rotating said cut drum;
a single position clutch including a driver and a follower which are engageable with each other when they are in a predetermined relative rotating phase;
means for operably connecting said driver of said single position clutch to said cut drum;
means for operably connecting said follower of said single position clutch to said tip applying means
signal generating means for coupling said follower and said driver of said single position clutch to drive said tip applying means when a leading tip is to be applied to said continuous sheet of material; and
timing means for retaining said cam means at its non-operative position for a time interval after the application of

each of said leading tips, during which a predetermined length of said sheet material is fed over said cut drum and for actuating said cam means to the operative position at the end of said time interval such that said sheet is cut by said cutting means substantially adjacent each of said heating tips along its rear edge.

3,997,388
DEHYDRATION OF MANURE

Victor Simon, 26, rue Vasco de Gama, 75015 Paris, France

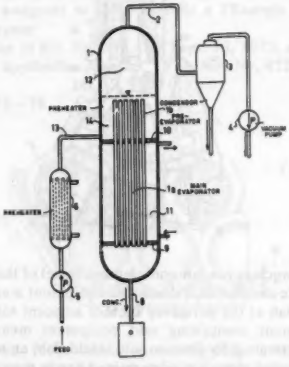
Filed Mar. 25, 1974, Ser. No. 454,642
Claims priority, application France, Apr. 2, 1973, 73.11814; Nov. 26, 1973, 73.42027; Mar. 1, 1974, 74.07178
Int. Cl.² B01D *1/00*
U.S. Cl. 159—47 R **2 Claims**

1. A method of dehydrating animal ordure, wherein said ordure comprises combustible fermentation gases, the said method comprising the successive steps of removing the said gases from the animal ordure and of causing the ordure to move along a path, while subjecting the ordure to the simultaneous action of hot air flowing in the opposite direction to the movement of the ordure and of ultrasonic vibrations.

3,997,389
CONCENTRATING SODIUM OR POTASSIUM HYDROXIDE

Robert Winkler, Wallisellen, Switzerland, assignor to Escher Wyss Limited, Zurich, Switzerland

Filed Dec. 10, 1974, Ser. No. 531,245
Claims priority, application Switzerland, Dec. 14, 1973, 17527/73
Int. Cl.² B01D *1/00, 1/22*
U.S. Cl. 159—49 **4 Claims**



1. In a process for concentrating sodium or potassium hydroxide which includes the steps of indirectly heating the solution in a main evaporator of the upright tube type to evaporate water and produce superheated vapors, separating the superheated vapors from the resulting concentrate and condensing said separated vapors, the improvement which comprises

a. causing solution being concentrated to pass downward through the tubes of the main evaporator as a falling film, and causing the superheated vapors produced during said concentration to pass upwardly through the tubes of the main evaporator;

b. feeding solution to the tubes of the main evaporator downward through upward extensions of those tubes which are outside the region of said indirect heating, which extension have a length which is at least 10% of the heated length of the main evaporator tubes, and through which said superheated vapors produced in the main evaporator tubes ascend, the solution passing downwardly through said tube extensions being in contact with and heated directly by the ascending super-heated vapors to thereby effect pre-evaporation of water from that solution before the latter is indirectly heated and concentrated in the main evaporator tubes;

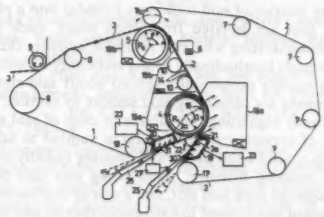
c. withdrawing concentrated solution from the lower ends of the main evaporator tubes; and

d. withdrawing the vapors produced during both main evaporation and pre-evaporation from the upper ends of the tube extensions and condensing same outside the evaporator.

3,997,390
TWIN-WIRE PAPER MACHINE AND METHOD FOR OPERATING THE SAME

Matti Kankkïnpaa, Tapiola, Finland, assignor to Valmet Oy, Helsinki, Finland

Continuation-in-part of Ser. No. 344,260, March 23, 1973, Pat. No. 3,846,232. This application July 31, 1974, Ser. No. 493,704
Int. Cl.² D21F *1/00*
U.S. Cl. 162—132 **20 Claims**



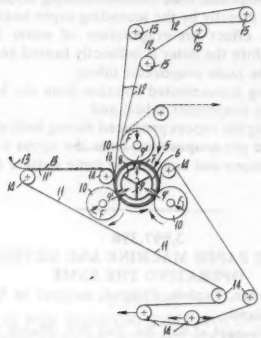
14. In a method of operating a twin-wire paper machine which has endless carrier and pressure wires respectively extending along separate closed loops while having coextensive common run portions between which a web is compressed during formation thereof while travelling from an inlet end to an outlet end of said common run portions, with a pair of guide rolls being situated in said loops in advance of said inlet end for directing the wires respectively along converging paths which define between themselves an entrance region to said inlet end, while a forming board means is situated in one of the loops and has a wall, formed with dewatering openings, engaging one of the wires between said inlet end and the guide roll which engages said one wire, with a headbox means being situated at least partly at the entrance region and having a pair of lips defining between themselves a slice through which the headbox means directs a stock jet toward said one wire and the forming board means which engages the same, said headbox means, at least one of said lips thereof, and the combination of said forming board means and the guide roll which engages said one wire respectively forming three units, comprising the step of adjusting at least one of said units for determining the angle of said jet with respect to said one wire, while depositing said jet on said one wire at a distance sufficiently in advance of said inlet end to determine the orientation of fibers in the web which forms on said one wire in advance of said inlet end prior to reaching said inlet end.

3,997,391

MULTI-PRESS FOR THE DEHYDRATION OF SHEET PRODUCTS

Giuseppe Ortolani, Guarcino, Localita La Pezza, Milan, il 15 Giugno, Italy

Filed July 28, 1971, Ser. No. 166,734
Claims priority, application Italy, Sept. 5, 1970, 29395/70
The portion of the term of this patent subsequent to July 1, 1990, has been disclaimed.
Int. Cl.² D21F 3/08, 3/10
U.S. Cl. 162—360 R 3 Claims



1. A multi-press for the dehydration of sheet products, comprising a stationary internal suction cylinder, an external cylinder rotatable on and relative to said stationary cylinder and permeable to the passage of fluid therethrough, means dividing the interior of said stationary cylinder into a plurality of sectors that are isolated from each other, each of said sectors communicating with said rotatable cylinder through a slot that extends longitudinally of the stationary cylinder, said slots being equally peripherally spaced about said stationary cylinder, means for subjecting said sectors to suction, means for individually regulating the suction in each of said sectors, a plurality of pressing cylinders equal in number to said slots and equally spaced apart about and pressing radially inwardly upon said rotating cylinder, there being one said pressing cylinder adjacent each said slot, and a pair of endless felts that are superposed and pressed toward each other by and between said suction cylinder and pressing cylinders over a path which comprises at least an arc between two said pressing cylinders.

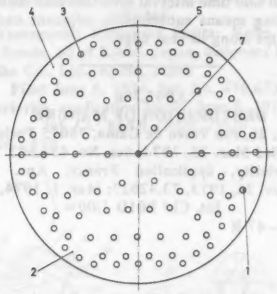
3,997,392

CONTROL ROD ARRANGEMENT FOR GAS-COOLED NUCLEAR REACTOR

Siegfried Brandes, Schriesheim, and Arnulf Huebner, Lampertheim, both of Germany, assignors to Hochtemperatur-Reactorbau GmbH, Cologne, Germany

Filed Oct. 31, 1975, Ser. No. 627,745
Claims priority, application Germany, Oct. 31, 1974, 2451749
Int. Cl.² G21C 7/08
U.S. Cl. 176—36 R 8 Claims

1. In a nuclear reactor including a core pile of fissionable fuel elements, and a plurality of control rods introduceable into said core pile for the control and adjustment of the nuclear reactor, said control rods being arranged so that the density of distribution thereof per unit of cross-sectional surface area of the core pile increases radially from the center of the core pile toward the periphery thereof.

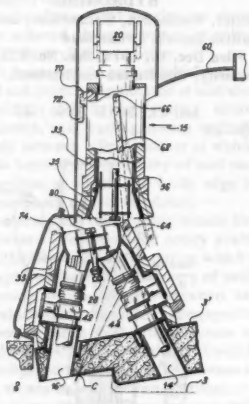


3,997,393

DEVICE FOR PROTECTING THE CONTAINMENT VESSEL DOME OF A NUCLEAR REACTOR

Albert Allain, Bruyeres-le-Chatel; Etienne Filloleau, Houilles, and Pierre Mulot, Brunoy, all of France, assignors to Commissariat a l'Energie Atomique, Paris, France

Filed Apr. 10, 1975, Ser. No. 567,028
Claims priority, application France, Apr. 11, 1974, 74.12839; June 10, 1974, 74.19970
Int. Cl.² G21C 9/00, 19/20
U.S. Cl. 176—38 14 Claims



1. In a nuclear reactor containment vessel of the type having a concrete shield slab, a dome and equipment means mounted on said slab at the periphery thereof adjacent said dome, the improvement comprising said equipment means having a lower section rigidly fixed to said shield slab, an upper section for separation along a predetermined line in response to tilting of said said slab upwardly and outwardly toward said periphery due to excessive pressure within said vessel connected to said lower section, guide means on said containment vessel for vertical rectilinear guiding of said upper section and mechanical means operatively connected between said upper and lower sections which will exert an upward thrust on said upper section upon said tilting of said slab and lower section with an attendant separation of said upper and lower lower sections.

3,997,394

FUEL ASSEMBLY SUPPORTING STRUCTURE

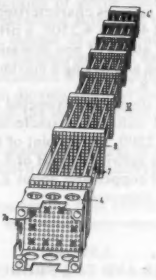
Friedrich-Wilhelm Aisch, Erlangen; Hans Peter Fuchs, Nurnberg; Diethelm Knödler, Erlangen; Alexander Steinke, Erlangen, and Josef Steven, Erlangen, all of Germany, assignors to Kraftwerk Union Aktiengesellschaft, Mulheim (Ruhr), Germany

Filed Mar. 20, 1975, Ser. No. 560,387

Claims priority, application Germany, Mar. 20, 1974, 2413464

Int. Cl.² G21C *3/30*

U.S. Cl. 176—78 6 Claims



1. A fuel assembly supporting structure comprising interspaced end pieces having holes formed therethrough, rods having ends positioned in said holes, fuel rod spacer grids positioned between said end pieces by said rods, and releaseable means for fastening the rods to said end pieces and which means at least at one of the end pieces releases that end piece, enabling said end piece to slide axially with respect to said rods when the end pieces receive abnormal thrust forces directed towards each other.

3,997,395

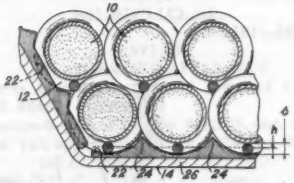
NUCLEAR FUEL ASSEMBLY

André Cayol, Montrouge; Georges Clottes, Manosque; Pierre Loriot, and Jean Skok, both of Aix en Provence, all of France, assignors to Commissariat a l'Energie Atomique, Paris, France

Continuation of Ser. No. 395,454, Sept. 10, 1973, abandoned. This application May 23, 1974, Ser. No. 472,803

Int. Cl.² G21C *3/16*

U.S. Cl. 176—78 5 Claims



1. A nuclear fuel assembly consisting of a cluster of identical canned-fuel pins disposed on a uniform triangular lattice within a sleeve defining a duct through which a coolant is circulated, said sleeve having internal faces and plates in said sleeve between said internal faces and said pins, each fuel pin having over its length a helical spacer member which determines the minimum spacing between said pin and the adjacent pins or the sleeve, said spacer members being identical and projecting a constant distance over their lengths, said plates having on the internal faces thereof recesses in which the spacer members of the lateral pins of the cluster are partially engaged, said recesses being displaced by an interval equal to one-sixth of the pitch of said spacer members between two successive faces of said sleeve, said recesses being rows of grooves of concave shape surrounding the spacer members, the distance between two successive grooves of one row being equal to the winding pitch of said spacer members.

3,997,396

METHOD FOR THE IN VITRO PROPAGATION AND MAINTENANCE OF CELLS

Jacques J. Delente, St. Louis, Mo., assignor to Monsanto Company, St. Louis, Mo.

Filed July 2, 1973, Ser. No. 376,038

Int. Cl.² C12K *9/00*

U.S. Cl. 195—1.8 12 Claims

1. A method for propagating or maintaining cells in vitro which comprises (a) contacting a suspension of cells in a cell culture medium with the exterior wall of a non-toxic, oxygen permeable, hollow, fiber membrane thereby to attach cells to said wall of said hollow fiber membrane and (b) contacting the opposite wall of said membrane with an oxygen carrier thereby to cause passage of oxygen through the said membrane and bring said oxygen into contact with the attached cells on the other side of the membrane and simultaneously incubating the cells in a nutrient cell culture medium under cell growth or maintenance conditions of pH and temperature, with oxygen being supplied in adequate quantities to provide aerobic conditions continuously to maintain cells in their normal, differentiated functional state.

3,997,397

PRODUCTION OF PROTEIC MATERIALS FROM YEAST CELLS

Renato Craveri; Cesarina Colla, and Valeria Cavazzoni, all of Milan, Italy, assignors to Societa Italiana Resine S.I.R. S.p.A., Milan, Italy

Filed Apr. 9, 1975, Ser. No. 566,474

Claims priority, application Italy, Apr. 19, 1974, 21650/74

Int. Cl.² C12B *1/00;* A23J *1/18*

U.S. Cl. 195—5 8 Claims

1. A process for producing proteic material from live yeast cells selected from the group consisting of *Candida lipolytica, Candida vini, Candida utilis, Hanseniaspora valbyensis, Kloeckera apiculata, Kloeckera africana, Kloeckera* sp., and *Saccharomycodes ludwigii* comprising (1) preparing a culture filtrate for use as a lytic factor for said yeast cells by growing a submerged culture of bacteria of the genus Cytophaga on a culture soil comprising live cells of yeast of the same species as that to be subsequently subject to lysis and (2) then utilizing directly the resulting culture filtrate as a lytic factor for the lysis of biomasses of said live yeasts, without subjecting said live yeast to any pretreatment.

3,997,398

EMULSIFYING AGENTS OF MICROBIOLOGICAL ORIGIN

James E. Zajic, London, and Eva Knettig, Sarnia, both of Canada, assignors to Canadian Patents and Development Limited, Ottawa, Canada

Continuation-in-part of Ser. No. 285,159, Aug. 31, 1972, abandoned. This application June 27, 1974, Ser. No. 483,590

Int. Cl.² C12B *1/00*

U.S. Cl. 195—28 R 15 Claims

1. A process for the production of an emulsifying agent of microbiological origin which will effect emulsification of hydrocarbon fuels in water, comprising the step of cultivating by an aerobic fermentation in aqueous nutrient solution and with paraffinic hydrocarbon substrate as principal source of assimilable carbon a micro-organism having all the characteristics of Corynebacterium hydrocarboclastus UWO409 or NRRL-B-5631 until the fermentation medium contains at least 0.1% by weight of an active emulsification agent consisting of an extra-

cellular polymer comprising a polysaccharide and a bound protein component, formed as a result of the fermentation.

3,997,399

FERMENTATION PROCESS FOR THE PRODUCTION OF CITRIC AND ISOCITRIC ACIDS

Paul Maldonado, Saint Symphorien d'Ozon, and Max Cherpentier, Montesson, both of France, assignors to Institut Francais du Petrole, des Carburants et Lubrifiants et Entreprise de Recherches et d'Activities Petrolieres Elf, Rueil-Malmaison, France

Filed May 14, 1975, Ser. No. 577,446

Claims priority, application France, May 15, 1974, 74.16911

Int. Cl.² C12B *1/00*

U.S. Cl. 195—29 **4 Claims**

1. In the production of citric and isocitric acids by fermentation of a nutrient medium by a *Candida lipolytic* yeast, said medium containing a hydrocarbon substrate as a source of carbon, substances which are sources of nitrogen, mineral compounds, and thiamin, the improvements which consist in employing a diploid *Candida lipolytica* yeast in a nutrient medium having a pH of between 2 and 7 and containing between 200 micrograms and 10 milligrams of thiamin per liter.

3,997,400

USE OF TANKERS AS FERMENTING VATS

Carl-Göran Hedén, Solna, Sweden, assignor to Rederi AB Salenia, Stockholm, Sweden

Filed Oct. 31, 1975, Ser. No. 627,912

Claims priority, application Sweden, Nov. 28, 1974, 7414953

Int. Cl.² C12B *1/00*

U.S. Cl. 195—32 **4 Claims**

1. A method of utilizing an oil tanker, comprising filling the tanker with oil, transporting the tanker on a body of water to place of utilization of the oil, unloading the oil from the tanker, sterilizing the interior of the tanker with a material which sterilizes as well as provides a fermentation nutrient, filling the tanker with fermentable material, fermenting said fermentable material to produce a fermentation product while transporting the tanker over a body of water to a place of utilization of the fermentation product, unloading and recovering the fermentation product from the fermentation waste, refilling the tanker with oil, and again transporting the tanker over a body of water to a place of utilization of the oil.

3,997,401

MICROBIAL TRANSFORMATION OF 8-CHLORO-10,11-DIHYDRODIBENZ[B,F][1,4]OXAZEPINE

James Jiu, and Seth S. Mizuba, both of Morton Grove, Ill., assignors to G. D. Searle & Co., Chicago, Ill.

Filed Dec. 8, 1975, Ser. No. 638,711

Int. Cl.² C12D *13/00*

U.S. Cl. 195—51 R **2 Claims**

1. A process for the preparation of 8-chloro-10,11-dihydrodibenz[b,f][1,4]oxazepine-11-one which comprises fermenting 8-chloro-10,11-dihydrodibenz[b,f][1,4]oxazepine with Hormodendrum sp. NRRL 8133 or enzymes therefrom in a suitable nutrient medium.

2. A process for the preparation of 8-chlorodibenz[b,f][1,4]oxazepine which comprises fermenting 8-chloro-10,11-dihydrodibenz[b,f][1,4]oxazepine with *Hormodendrum cladosporioides* NRRL 8132 or enzymes therefrom in a suitable nutrient medium.

3,997,402

SUPEROXIDE DISMUTASE AND PROCESS FOR PRODUCTION

Adolf Michael Michelson, Chatenay-Malabry, France, assignor to Agence Nationale de Valorisation de la Recherche (ANVAR), Paris, France

Continuation-in-part of Ser. No. 461,379, April 16, 1974, abandoned. This application May 6, 1975, Ser. No. 575,025

Claims priority, application France, Apr. 16, 1973, 73.13670

Int. Cl.² C07G *7/026*

U.S. Cl. 195—62 **14 Claims**

10. A superoxide dismutase extracted from marine photobacterium bacterial cultures characterized by having a molecular weight of about 40,000 + 2500, a pHi point of about 4 to 7, containing 1 to 2 atoms of non-hematinic iron per mole of superoxide dismutase and having a maximum enzymatic activity at a pH between 8.5 to 10.

14. A superoxide dismutase extracted from marine photobacterium bacterial cultures characterized by a molecular weight of 33,000 + 2500, a pHi point of about 8,25, having a maximum enzymatic activity at a pH of 8.5 to 10 and containing about 1 atom of copper and about 2.0 atoms of zinc per mole of superoxide dismutase.

3,997,403

ANTIBIOTIC G-418 AND THE PRODUCTION THEREOF

Marvin J. Weinstein; Gerald H. Wagman, both of East Brunswick; Raymond T. Testa, Verona, and Joseph A. Marquez, Montclair, all of N.J., assignors to Schering Corporation, Kenilworth, N.J.

Continuation-in-part of Ser. No. 414,010, Nov. 8, 1973, Pat. No. 3,959,254, which is a continuation-in-part of Ser. No. 196,707, Nov. 8, 1971, abandoned. This application Oct. 10, 1975, Ser. No. 621,266

Int. Cl.² C12D *9/20*

U.S. Cl. 195—96 **7 Claims**

1. A process of producing Antibiotic G-418 which comprises cultivating *Micromonospora rhodorangea* in an aqueous nutrient medium containing assimilable sources of carbon and nitrogen until substantial antibiotic activity is produced and recovering Antibiotic G-418 therefrom.

3,997,404

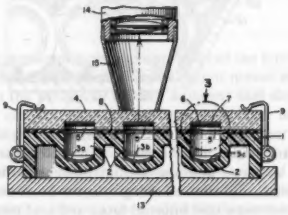
METHOD AND APPARATUS FOR CHARACTERIZING BIOLOGICALLY ACTIVE AGENTS

John R. Waters, Towson, Md., assignor to Johnston Laboratories, Inc., Cockeysville, Md.

Continuation-in-part of Ser. No. 477,452, June 7, 1974, Pat. No. 3,944,471. This application May 27, 1975, Ser. No. 581,277

Int. Cl.² C12K *1/04*

U.S. Cl. 195—103.5 R **47 Claims**



1. Apparatus for characterization of a biologically active agent comprising:

a. a plurality of sterile chambers containing different ^{14}C-labeled fermentable substrates,

b. means to facilitate introduction of an axenic sample of a

biologically active agent to be characterized into each chamber,

c. means for sealing each chamber to form a gas-tight cell having a light permeable wall section,

d. a carbon dioxide absorber in each cell, and

e. a scintillation compound in each cell in intimate proximity to said carbon dioxide absorber;

said carbon dioxide absorber and said scintillation compound in each cell being disposed adjacent said light permeable wall section and out of contact with said ^{14}C-labeled fermentable substrates.

25. A method for characterization of a biologically active agent comprising the steps of:

a. providing a plurality of sterile containers with different ^{14}C-labeled fermentable substrates therein;

b. introducing a sample of an axenic biologically active material to be characterized into each container;

c. sealing said containers with a gas-tight transparent cover having a carbon dioxide absorber and a scintillation compound coated on the inside thereof in intimate proximity to each other;

d. subjecting the sealed containers to conditions conducive to biological activity for a predetermined period of time; and

e. thereafter measuring the light emitted by said scintillation compound in each container through the transparent cover.

3,997,405

METHOD AND ARRANGEMENT FOR USE WITH BIOCHEMICAL REACTIONS

Hans Müller, Erlenbach, and Felix Müller, Stafa, both of Switzerland, assignors to Hans Müller, Erlechenbach, Zurich, Switzerland

Filed Mar. 24, 1975, Ser. No. 561,456

Claims priority, application Switzerland, Mar. 26, 1974, 4291/74

Int. Cl.² C12B *1/00*

U.S. Cl. 195—104 **17 Claims**

1. In an exothermic reaction process for growing micro-organisms in a culture medium contained in a vessel, the improvement which comprises the steps of circulating through the contents of the vessel a vaporizable cooling medium in a close path so that the vaporizable cooling medium remains separate from but passes into heat-exchange relationship with the culture medium so as to be vaporized by the heat liberated by the micro-organisms; conveying the vaporized medium away from the vessel in said path to a predetermined location; and liberating heat at said location so as to perform a heating function, by compressing the vaporized medium in a portion of said path so as to increase the thermal energy of the vaporized medium which is available for the heating function.

3,997,406

EVAPORATING APPARATUS

Kostas Savas Arvanitakis, 14945 S. Dogwood Ave., Orland Park, Ill. 60462

Continuation-in-part of Ser. No. 408,185, Oct. 19, 1973, abandoned. This application Dec. 16, 1974, Ser. No. 533,205

Int. Cl.² B01D *1/00, 1/22, 3/00*

U.S. Cl. 202—175 **10 Claims**

1. Apparatus for disposing of contaminated slurries comprising liquid bearing solids materials therein, including

auger conveyor means including a cylindrical chamber and a rotating auger screw with flights therealong for advancing a slurry of contaminated liquid bearing solids materials therein,

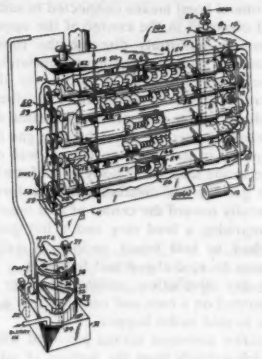
means for passing said slurry to said auger conveyor means,

heating means in thermal contact with said auger conveyor means to provide a heated interior surface in said chamber for heating said surface to a temperature sufficient to vaporize at least a portion of the liquid from the slurry,

means operatively connected to said auger conveyor means for applying the slurry to said heated surface thereby evaporating a portion of the liquid and forming a residue of slurry on said surface, and removing the residue so formed from said surface,

means for increasing the solids materials in a zone along a portion of the auger screw and chamber between the ends thereof comprising substantially reduced diameter portions of the peripheries of the auger flights with respect to the diameters of the auger flights immediately upstream and downstream thereof, for forming a partial obstruction in said zone composed of said residue of slurry for impending the flow of said liquid slurry material, while allowing passage of the vapors created in the vaporization process, and

means for withdrawing said residue so formed from said apparatus.



3,997,407

APPARATUS FOR DISPOSAL OF RUBBER WASTE

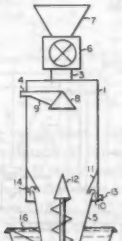
Heihachiro Fujii, Fujisawa; Shiro Nebashi, Urawa, and Yoshimasa Zaitsu, Kawasaki, all of Japan, assignors to Fuji Kasui Engineering Co., Ltd., Tokyo, Japan

Division of Ser. No. 505,376, Sept. 12, 1974, abandoned. This application Sept. 3, 1975, Ser. No. 609,952

Claims priority, application Japan, Dec. 24, 1973, 49-000882; July 13, 1974, 49-080527

Int. Cl.² C10B *1/04, 35/00, 45/00*; C10J *3/72*

U.S. Cl. 202—221 **1 Claim**



1. A vertical dry distillation retort of internal heating type for the disposal of rubber wastes for recovering valuable substances contained therein comprising:

a. a vertical dry distillation retort body having an upper portion with a substantially cylindrical shape, and a lower portion which is trapezoidal in shape, said retort having an inlet means at the top of the upper cylindrical portion for feeding shredded rubber waste blocks to be treated and a dry distillation gas outlet means in the upper portion thereof, said lower portion forming an outlet hopper means for discharging dry distillation residue from said retort.

b. a conical hood means connected to said gas outlet means and disposed in the center of the upper portion of said retort to uniformly disperse the rubber blocks to be treated in said retort while appropriately sizing the rubber blocks to be treated according to the block size to, thereby, make the temperature distribution in said retort uniform, and to suck off the generated dry distillation gas,

c. means for feeding a hot heating gas for dry distillation disposed in the lower peripheral wall of said upper portion inside said retort body to uniformly jet and feed the hot gas for dry distillation in the form of a thin layer laterally toward the center of said retort, said feed means comprising a feed ring and a hot gas guide means attached to said lower peripheral wall with said guide means located above said feed ring,

d. a dry distillation residue receiver means rotatably mounted on a base and connected in a water-sealed fashion to said outlet hopper,

e. a screw conveyer means provided with a vertical shaft, which extends from the bottom of said residue receiver through said hopper means to a lower central section of the upper portion of said retort body to discharge the dry distillation residue out of said retort body into said residue receiver means,

f. a cone member fixedly mounted on the top of said screw conveyer means to make the residence time of the rubber blocks in said retort uniform and to increase the dry distillation efficiency, and

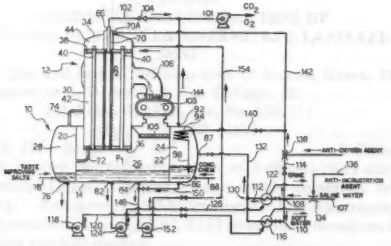
g. a discharge chute means for discharging said dry distillation residue, fixed to the lower portion of said retort body, which chute extends in said residue receiver means from the lower inside edge thereof to the upper inside edge thereof while being in contact with the inner peripheral surface of said rotating residue receiver means.

3,997,408

THERMOCOMPRESSION-TYPE APPARATUS FOR DESALTING SALINE WATER

Diego Barba; Franco Concari, and Giancarlo Spizzichino, all of Rome, Italy, assignors to Societa Italiana Resine S.I.R. S.p.A., Milan, Italy

Filed Mar. 19, 1975, Ser. No. 560,012
Claims priority, application Italy, Mar. 25, 1974, 67938/74
Int. Cl.² B01D *3/10, 1/22*
U.S. Cl. 202—236 **7 Claims**



1. In a thermocompression desalting apparatus for saline water comprising: an evaporator section including a heating chamber and a bundle of evaporator tubes crossing the chamber; means for circulating saline water through the tubes in the bundle, the said means including a separating chamber in which the steam produced in the evaporator section is separated from the non-evaporated saline water; a compressor arranged to suck steam from the separating chamber and to deliver it at an increased pressure to the heating chamber as heating fluid for the evaporator tubes; and means for recovering the condensate from the heating chamber; the improvement comprising: the said evaporator tubes extending vertically above the separating chamber and having their lower ends opening into the latter through a lower header plate; the upper ends of the evaporator tubes extending through an upper header plate into a plenum chamber overlying the latter, said plenum chamber being included in said circulating means and being arranged to provide a pool of said water submerging the upper ends of the evaporator tubes; each of said upper ends having means therein arranged to receive saline water from the said pool and to discharge it in the form of a falling film on the inner surface of its respective evaporator tube, a suction tube in the heating chamber depending from the upper header plate into the lower half of the height of the heating chamber, means connecting the upper end of the suction tube to a vacuum source, and a steam condenser in the suction tube.

3,997,409

METHOD FOR ELECTROPLATING EXTRUSION-RESISTANT LEAD COATINGS ON URANIUM AND THE ALLOYS THEREOF

Charles J. Nolan, Latham, and V. Peter Greco, Amsterdam, both of N.Y., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Sept. 3, 1975, Ser. No. 610,025
Int. Cl.² C25D *5/32, 5/46*
U.S. Cl. 204—1.5 **2 Claims**

1. A method of electroplating successive layers of copper and lead on the exterior surfaces of a billet formed of depleted uranium or an alloy thereof for facilitating the subsequent hydrostatic extrusion thereof at room temperature, comprising the steps of:

sandblasting the exterior of the billet with a relatively coarse nonmetallic grit to expose a surface free of oxide film;

removing the sandblasting residue from the exterior surface of the billet;

inserting the billet into a copper-plating electrolyte with less than one minute of exposure of any oxygen-containing environment after the completion of the sandblasting;

electrodepositing a layer of copper directly onto the exposed surface of the billet to a nominal thickness of ½ mil;

transferring the copper-plated billet to a lead-plating electrolyte with less than one minute of exposure thereof to any oxygen-containing environment; and

electrodepositing a layer of lead directly on the electroplated copper to a nominal thickness of 1 mil to form an outer coating capable of incremental shearing response to extrusion pressures as high as 350 ksi without detriment to the initial adhesion of the layers of the copper and lead.

3,997,410

ELECTRODEPOSITION OF ALUMINUM

Eliezer Gileadi, 9 Maale Hashoeva St., Ramat-Gan, and Emanuel Peled, 4 Hashomer St., Givatayim, both of Israel

Filed Feb. 3, 1975, Ser. No. 546,785
Claims priority, application Israel, Feb. 6, 1974, 44151
Int. Cl.² C25D *1/00*
U.S. Cl. 204—14 N **14 Claims**

1. An electrolyte for the electrodeposition of aluminum consisting essentially of:

a. 10 to 50 wt% aluminum bromide

b. a substantially anhydrous organic solvent selected from the group consisting of toluene, and toluene in admixture with other aromatic liquid solvents for aluminum bromide, other than benzene;

c. an additive selected from the group consisting of aromatic hydrocarbons having at least two rings; alkylated monocyclic or polycyclic aromatic compounds, amino-substituted mono- or polycyclic aromatic compounds, dialkyl aniline, and trialkyl amine;

wherein solvent (b) and additive (c), the latter of which may also serve as solvent, constitute about 50 to 89.7 wt.% of said electrolytes;

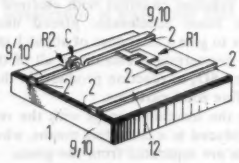
d. bromides or iodides selected from the group consisting of alkali metal halides, alkaline earth metal halides, boron halides, ammonium halides, aliphatic and aromatic quaternary ammonium halides and mixtures of any of these, comprising from 0.3 wt.% up to concentration of saturation in said electrolyte.

3,997,411

METHOD FOR THE PRODUCTION OF A THIN FILM ELECTRIC CIRCUIT

Wolf-Dieter Müenz, Unterhaching, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Division of Ser. No. 480,826, June 19, 1974, Pat. No. 3,949,275. This application Jan. 22, 1975, Ser. No. 543,140
Claims priority, application Germany, June 20, 1973, 2331586
Int. Cl.² C25D *5/02*
U.S. Cl. 204—15 **16 Claims**



1. Method for the production of a thin-film circuit, comprising the steps of:

applying a first tantalum-aluminum alloy layer with a tantalum content between 30 and 70 atomic percent onto a substrate,

applying a second tantalum-aluminum alloy layer with a tantalum content between 2 and 20 atomic percent to said first alloy layer, and thereby providing a double tantalum-aluminum layer of different tantalum contents,

etching the second alloy layer in a predetermined area by a masking and etching technique which etches said second alloy layer without etching said first alloy layer,

producing an interruption in the first alloy layer in a predetermined area by masking and etching techniques,

anodically oxidizing the second tantalum-aluminum alloy layer to form a capacitor dielectric,

applying a conductive material to the remaining parts of the first alloy layer to define a conductive path, and

applying a conductive material to the tantalum-aluminum oxide layer to define a capacitor electrode.

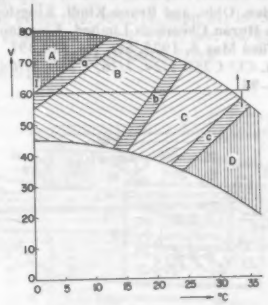
3,997,412

METHOD OF FORMING OXIDE FILM ON ALUMINUM OR ALUMINUM ALLOY

Masashi Ikegaya, and Fumio Shigeta, both of Shizuoka, Japan, assignors to Riken Light Metal Industries Company, Ltd., Tokyo, Japan

Filed Feb. 28, 1975, Ser. No. 554,017
Claims priority, application Japan, May 22, 1974, 49-57495
Int. Cl.² C25D *11/08, 11/10, 11/14*
U.S. Cl. 204—58 **4 Claims**

1. A method of forming a silver tone color oxide film on the surface of an aluminum material by anodizing said aluminum material in an aqueous solution consisting essentially of 2.5 to 2.7% by weight of an oxalic acid, 0.15 to 0.17% by weight of sulfuric acid and 1.8 to 2.0 g/l of aluminum ions, applying an electrolyzing voltage in the range of from about 20 volts to about 55 volts and maintaining the temperature of said aqueous solution in the range of from about 25° C. to about 40° C. for a time period in the range of from about 10 minutes to about 30 minutes, whereby said oxide film is provided with a color tone of silver.

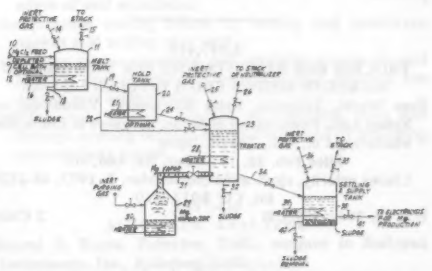


3,997,413

PURIFICATION OF MAGNESIUM CHLORIDE CELL BATH MATERIAL USEFUL FOR THE PRODUCTION OF MAGNESIUM METAL BY ELECTROLYSIS

Sven Fougner, 110 10th St., Garden City, N.Y. 11530

Filed Oct. 23, 1975, Ser. No. 625,078
Int. Cl.² C25C *3/04;* **C01F** *1/00*
U.S. Cl. 204—70 **20 Claims**

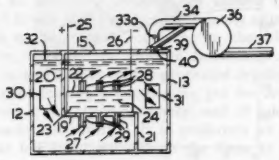


1. A method of treating magnesium chloride-containing material for use in an electrolytic cell for the production of elemental magnesium which comprises melting said magnesium chloride-containing material, introducing vaporized magnesium metal into contact with the resulting molten magnesium chloride-containing material under conditions to effect condensation of the vaporized magnesium metal and withdrawing the resulting treated molten magnesium chloride-containing material, said treated molten magnesium chloride-containing material after having been withdrawn and passed to a settling tank, is settled and any sludge or impurities settling out or separating therefrom are withdrawn from the bottom of the settling tank to produce a substantially impurity free magnesium chloride material.

3,997,414
GAS CONCENTRATED AND COOLED ELECTROLYTIC CELL

Harold Vincent Casson, Napanee, Canada; Richard Eric Loftfield, Chardon, Ohio, and Bruno Kindl, Kingston, Canada, assignors to Huron Chemicals Limited, Kingston, Canada

Filed May 5, 1975, Ser. No. 574,391
Int. Cl.² C25B *1/24, 1/26;* C25D *21/04*
U.S. Cl. 204—95 12 Claims

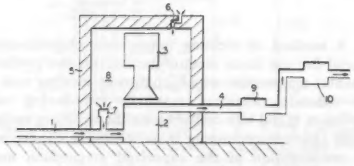


1. An electrolytic cell comprising a cell chamber adapted to contain an electrolytic solution and having an electrode assembly of anodes and cathodes adapted to electrolyze said electrolytic solution to generate a dissolved product and a gas, means for removing said gas from said cell chamber, a cooling and concentration chamber, at least one conduit communicating between said cell chamber and said cooling, evaporation and concentration chamber for the circulation of electrolytic solution from the cell chamber to the cooling and concentration chamber, at least one conduit communicating between said cooling and concentration chamber and said cell chamber for the circulation of electrolytic solution from the cooling and concentration chamber to the cell chamber, each of said conduits being below the level of the electrolytic solution in at least one of said chambers to avoid the passage of gas between the chambers and said chambers being substantially sealed against the passage of gas from one to the other, inlet and outlet means for producing a gas sweep through the cooling and concentration chamber across the surface of the electrolyte in such chamber to cool the electrolyte and evaporate part of said electrolyte so as to concentrate it, means for introducing fresh electrolytic solution into said electrolytic cell and means for removing solution containing the dissolved product.

3,997,415
PROCESS FOR REMOVING SULFUR DIOXIDE AND NITROGEN OXIDES FROM EFFLUENT GASES

Sueo Machi, Takasaki; Keita Kawamura, Yokohama, and Shingi Aoki, Fujisawa, all of Japan, assignors to Ebara Manufacturing Co., Ltd., Tokyo, Japan

Filed Feb. 28, 1974, Ser. No. 446,765
Claims priority, application Japan, Mar. 3, 1973, 48-25289
Int. Cl.² B01J *1/10*
U.S. Cl. 204—157.1 H 2 Claims



1. A process for removing NO_x and SO_2 from effluent gases containing NO_x and SO_2 while simultaneously purifying contaminated air containing NO_x and O_3 which is produced in an irradiation room comprising:

discharging the contaminated air containing NO_x and O_3 from the irradiation room by an exhaust blower and mixing it with a stream of the effluent gases containing NO_x and SO_2,

irradiating the mixture of the effluent gases containing SO_2 and NO_x and the contaminated air containing NO_x and O_3 in a reaction chamber with electron beams from an electron beam accelerator placed near the reaction chamber to give a total dose of about 1 megarad or more, thereby converting substantially all of the gaseous NO_x and some SO_2 to reaction products in the form of a mist and/or fine solid particles,

delivering the irradiated gases with the reaction products thus produced to a collecting means, where said reaction products are separated from the gases,

delivering the gases containing the remaining SO_2 to means for removing SO_2 and removing substantially all of the remaining SO_2 and

releasing the thus purified effluent gases into the atmosphere.

2. A process for removing NO_x and SO_2 from effluent gases containing NO_x and SO_2 while simultaneously purifying contaminated air containing NO_x and O_3 which is produced in an irradiation room comprising:

discharging the contaminated air containing NO_x and O_3 from the irradiation room by an exhaust blower to blow it directly into a reaction chamber to which a stream of the effluent gases containing NO_x and SO_2 is delivered,

irradiating the mixture of the effluent gases containing SO_2 and NO_x and the contaminated air containing NO_x and O_3 in a reaction chamber with electron beams from an electron beam accelerator placed near the reaction chamber to give a total dose of about 1 megarad or more, thereby converting substantially all of the gaseous NO_x and some SO_2 to reaction products in the form of a mist and/or fine solid particles,

delivering the irradiated gases with the reaction products thus produced to a collecting means, where said reaction products are separated from the gases,

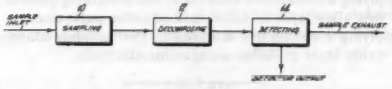
delivering the gases containing the remaining SO_2 to a means for removing SO_2 and removing substantially all of the remaining SO_2, and

releasing the thus purified effluent gases into the atmosphere.

3,997,416
METHOD AND APPARATUS FOR ANALYZING GASEOUS MIXTURES

Robert G. Confer, Colonia, N.J., assignor to Exxon Research and Engineering Company, Linden, N.J.

Filed Sept. 20, 1974, Ser. No. 507,775
Int. Cl.² G01N *33/00*
U.S. Cl. 23—232 E 10 Claims



1. A method of analyzing a gaseous mixture comprising:

a. sampling said gaseous mixture;

b. exposing said gaseous mixture sample of (a) to ultraviolet radiation of sufficient intensity to decompose at least one predetermined component of said mixture to be analyzed and thereby provide a gaseous sample with decomposition products of said component;

c. measuring the quantity of decomposition products in said gaseous sample from step (b) by absorbing said decomposition products in a liquid absorbent and measuring the change in electrical conductivity of said liquid absorbent with said decomposition products, and thereafter relating said measured change to the amount of said predetermined component in said sample.

3,997,417

PROCESS FOR RADIATION POLYMERIZATION AND COPOLYMERIZATION OF MONOMERS WITH OLEFINIC DOUBLE BONDS USING METAL HALIDE CATALYSTS

Miroslav Marek; Ludek Toman, and Jan Pecka, all of Prague, Czechoslovakia, assignors to Ceskoslovenska akademie ved, Prague, Czechoslovakia

Continuation-in-part of Ser. No. 133,354, April 12, 1971, abandoned. This application Sept. 28, 1971, Ser. No. 184,637
Claims priority, application Czechoslovakia, Apr. 21, 1970, 2712/70; Apr. 22, 1970, 2792/70
Int. Cl.² C08F 2/46, 4/00
U.S. Cl. 204—159.24 10 Claims

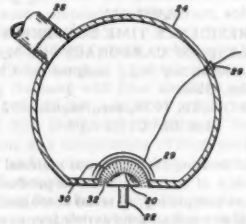
1. A process for polymerizing mono-olefinic monomers and forming homopolymers and copolymers thereof comprising subjecting to a source of light selected from the group consisting of ultraviolet, infrared and visible light a polymerizable mixture selected from the group consisting of (a) at least one mono-olefinic monomer selected from the group consisting of isobutylene, styrene, isobutyvinylether and α-methylstyrene and at least one tetravalent metal halide catalyst, and (b) at least one mono-olefinic monomer selected from the group in (a), at least one diene selected from the group consisting of butadiene, isoprene, 2,3 - dimethylbutadiene -1,3 and chloroprene and at least one tetravalent metal halide catalyst selected from the group consisting of zirconium the halides of titanium and vanadium, bringing the mixture to a temperature in a range of about −140° C. to about +30° C. and maintaining the mixture at a temperature in such range until polymerization is complete.

3,997,418

ELECTROPHORETIC COATING

Kenneth E. Buse, New Kensington, and Raymond J. Meyer, Apollo, both of Pa., assignors to Aluminum Company of America, Pittsburgh, Pa.

Filed Nov. 9, 1972, Ser. No. 304,916
Int. Cl.² C25D 13/12, 13/22
U.S. Cl. 204—181 4 Claims



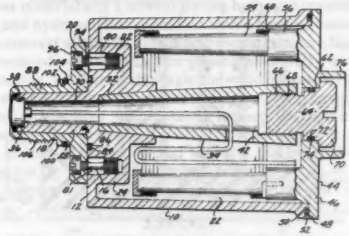
1. A process for electrophoretic coating which comprises conducting electrically charged round head metal fasteners beneath at least one oppositely charged nozzle having a part circular shaped discharge portion and passing a current between said nozzle and said fasteners while flowing a coating medium from said discharge portion of said nozzle onto said surface of said fasteners to be coated, thereby coating the same substantially uniformly with said coating medium.

3,997,419

DISSOLVED OXYGEN CELL

Timothy F. Scott, Brea, and Gordon R. Brushwyler, Anaheim, both of Calif., assignors to Robertshaw Controls Company, Richmond, Va.

Continuation of Ser. No. 399,374, Sept. 21, 1973, abandoned. This application June 9, 1975, Ser. No. 585,030
Int. Cl.² G01N 27/46
U.S. Cl. 204—195 P 14 Claims



1. An oxygen sensing apparatus comprising:
a housing bearing a projecting boss extending from one end thereof with a through opening extending through said boss and terminating in a sealing edge;
a lid removably and sealably engaged to the opposite end of said housing to define a chamber therein;
spaced apart electrode means in said apparatus comprising anode means within said housing and a cathode assembly removably seated in the outboard end of said through opening and including collar means removably seated in said through opening and having a central bore and a plurality of apertures in fluid communicatiion with said through opening and a cathode plug having a central boss seated in said bore and a cathode head received in the outboard end of said collar means and surrounded by said sealing edge;
barrier means in the form of an oxygen-permeable membrane overlying said cathode plug and having its peripheral edges turned back over said sealing edge;
retaining means telescopically overfitting said boss and formed with an inturned rim overlying the peripheral edges of said membrane;
compressible sealing means for sealing said membrane against said sealing edge; and
mounting means mounting said retaining means on said housing and operative to compress said inturned rim against said sealing edge;
whereby said cathode assembly is removable from said through opening through said outboard end by detaching said retaining means.

3,997,420

AUTOMATIC ANALYZER

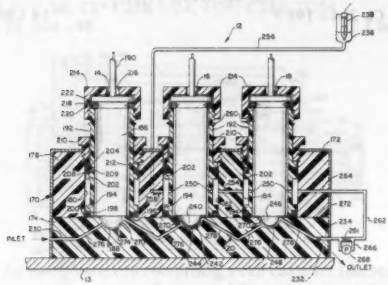
Edmund E. Buzza, Fullerton, Calif., assignor to Beckman Instruments, Inc., Fullerton, Calif.

Continuation of Ser. No. 125,770, March 18, 1971, abandoned. This application Feb. 18, 1975, Ser. No. 550,271
Int. Cl.² G01N 27/46
U.S. Cl. 204—195 P 3 Claims

1. A flow cell assembly containing ion measuring and gas sensitive sensors for electrochemical analyses, said assembly comprising:
a body of insulating material having a sample passage extending therethrough;
an ion measuring electrode mounted in said body and havin an ion sensing end positioned to contact sample flowing through said passage;
a gas sensitive electrode including a sensing end mounted in said body and a gas permeable essentially ion imperme-

able membrane separating said sensing end from sample flowing through said passage, said membrane being spaced from said sensing end to provide therebetween an electrolyte film space;

a reservoir containing a reference electrolyte for said gas sensitive electrode;



electrolyte communicating passages between said reservoir and said film space and said sample passage; and

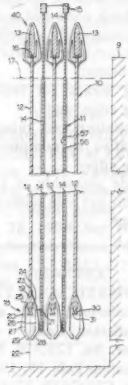
an electrode mounted in said reservoir, said last mentioned electrode combining with said ion measuring electrode to define said ion measuring sensor and combining with said gas sensitive electrode to define said gas measuring sensor in said assembly.

3,997,421

TOP-MOUNTED ANODE SPACER CLIP

Roland Perri, Trail, and Leonard J. Heinrick, Montrose, both of Canada, assignors to Cominco Ltd., Vancouver, Canada

Filed Feb. 2, 1976, Ser. No. 655,021
Int. Cl.² C25C 7/00
U.S. Cl. 204—267 **18 Claims**



10. An electrolytic cell with a plurality of alternate anodes and cathodes contained therein, said anodes and cathodes comprising planar sheets attached to and suspended from elongated header bars in substantially parallel spaced relationship, each anode having at least one lower spacer clip secured to the bottom edge thereof and at least one upper spacer clip secured to the anode header bar, said upper spacer clip comprising: a central body portion defining a vertex, a pair of arms diverging from the vertex and adapted to fit snugly over a length of the said header bar with said arms converging at their free ends in proximity to the juncture of the header bar and anode sheet, a pair of symmetrically diverging exterior wings depending from the arms having a maximum spacing from each other substantially coextensive with the ends of the said arms and thence converging towards each other beyond the free ends of said arms, said arms being sufficiently elastic to permit separation of their ends for placement over the header bar, and said wings being sufficiently elastic to resiliently resist lateral pressures from adjacent cathode sheets.

3,997,422

COMBINATION COAL DEASHING AND COKING PROCESS

Willard C. Bull, McCandless Township, Pa., and Vaughn L. Bullough, Florence, Ala., assignors to Gulf Oil Corporation, Pittsburgh, Pa. and Reynolds Metals Company, Richmond, Va.

Filed June 20, 1975, Ser. No. 588,809
Int. Cl.² C10G 1/06
U.S. Cl. 208—8 **12 Claims**

1. A process for the conversion of ash-containing raw coal to deashed coke comprising solvent-treating raw coal with recycle solvent liquid in the presence of added hydrogen, said solvent-treatment including passage through a tubular reactor having a length to diameter ratio of at least 100 at a temperature between 400° and 500° C. and a hydrogen pressure between 35 and 300 kg/cm² to dissolve hydrocarbonaceous material from ash-containing raw coal, separating said hydrocarbonaceous material from said ash, said separated hydrocarbonaceous material comprising a fraction which is solid at room temperature in major proportion together with a first solvent boiling range liquid fraction, operating said solvent-treatment under conditions of temperature and residence time so that the amount of said first solvent boiling range liquid fraction is less than the amount of said recycle solvent liquid, obtaining the remainder of said recycle solvent liquid by heating at least a portion of said solid fraction to a temperature above the highest temperature employed in said solvent-treating step and delay coking said heated solid fraction without added hydrogen to produce deashed coke, a second solvent boiling range liquid fraction and coker hydrogen, recycling said coker hydrogen to said solvent-treatment step, and recycling substantially said entire first and second solvent boiling range liquid fractions to said solvent-treatment step.

3,997,423

SHORT RESIDENCE TIME LOW PRESSURE HYDROPYROLYSIS OF CARBONACEOUS MATERIALS

Marvin Greene, Somerset, N.J., assignor to Cities Service Company, Tulsa, Okla.

Filed Oct. 20, 1975, Ser. No. 623,692
Int. Cl.² C10G 1/06
U.S. Cl. 208—8 **9 Claims**

1. A process of treating carbonaceous material with hydrogen, in the absence of added catalyst, to produce a yield of carbonaceous tars comprising, in serial combination,

a. adding liquid or crushed solid carbonaceous material to a reactor,

b. adding hot hydrogen to the stream of carbonaceous material,

c. reacting the hydrogen and the carbonaceous material at a pressure between atmospheric pressure and 250 psia. and temperature varying from about 400° to about 2000° C., and

d. quenching the mixture, with the total residence time for steps (b) and (c) varying from about 2 milliseconds to about 2 seconds.

3,997,424

HYDROGENATIVE TREATMENT OF COAL

Donald Bremner Urquhart, London, England, assignor to Coal Industry (Patents) Limited, London, England

Filed Nov. 12, 1974, Ser. No. 523,066

Claims priority, application United Kingdom, Nov. 27, 1973, 55020/73

Int. Cl.² C10G *1/04*

U.S. Cl. 208—8 7 Claims

1. A process for the hydrogenative treatment of coal which comprises contacting the coal with carbon monoxide, water and a gaseous organic solvent at a reaction temperature within the range of 300° to 500° C., said solvent comprising one or more solvent components each of which, at the reaction temperature, is above its critical temperature and pressure, extracting the reaction products in the gaseous phase separating the gaseous phase from the residue, and thereafter recovering the reaction products from said gaseous phase.

3,997,425

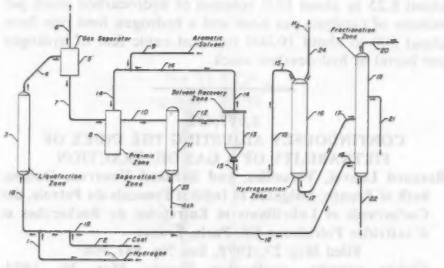
PROCESS FOR THE LIQUEFACTION OF COAL

John G. Gatsis, and Gim Tan, both of Des Plaines, Ill., assignors to Universal Oil Products Company, Des Plaines, Ill.

Filed Dec. 26, 1974, Ser. No. 536,680

Int. Cl.² C10G *1/06*

U.S. Cl. 208—8 5 Claims



1. A process for producing hydrocarbonaceous liquid products from coal which comprises the steps of:

a. contacting the coal, at a temperature of from about 150° to about 450° C. and a pressure of from about 10 to about 300 atmospheres with an asphaltene-free hydrogenated coal oil solvent and hydrogen;

b. separating gas from the resultant mixture to provide a liquid phase comprising coal extract, solvent and finely divided solid particles;

c. supplying said liquid phase, including substantially all of said coal oil solvent, to a pre-mix zone and therein commingling the same with from about 10 weight percent to about 1000 weight percent of a light aromatic solvent selected from the group consisting of benzene, toluene and xylene at a temperature of from about 10° to about 150° C. and a pressure of from about atmospheric to about 25 atmospheres;

d. introducing the mixture from the pre-mix zone to a separation zone and therein separating a solid ash from the admixed liquids;

e. thereafter removing said light aromatic solvent from said admixed liquids in a solvent recovery zone;

f. removing an ash-free hydrocarbon stream from said solvent recovery zone and hydrogenating at least a portion thereof to form an asphaltene-free hydrogenated coal oil; and

g. supplying at least a portion of said hydrogenated coal oil to step (a) as said asphaltene-free hydrogenated coal oil solvent.

3,997,426

PROCESS FOR THE CONVERSION OF CARBONACEOUS MATERIALS

Angelo A. Montagna, Monroeville, and Howard G. McIlvried, McCandless Township, both of Pa., assignors to Gulf Research & Development Company, Pittsburgh, Pa.

Filed Apr. 10, 1975, Ser. No. 566,934

Int. Cl.² C10G *1/08*

U.S. Cl. 208—10 12 Claims

1. In a process wherein a slurry composed of a solid carbonaceous material and a solvent having hydrogen transfer properties and hydrogen are contacted with a hydrogenation catalyst to convert said solid carbonaceous material to a liquid, the improvement which comprises passing said slurry under hydrogenation conditions through the void spaces of a fixed catalyst bed composed of said hydrogenation catalyst, the catalyst particles of said catalyst having a maximum wall thickness in the least thick portion thereof of about 1/32 to about ½ inch, said catalyst bed having a reactor void volume of about 50 to about 90 volume percent.

3,997,427

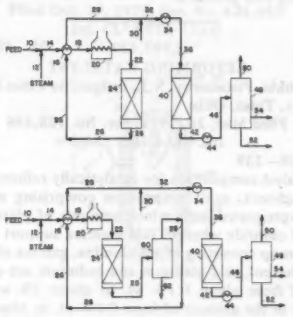
REDUCING HYDROGEN CONSUMPTION IN HYDROTREATING PETROLEUM FRACTIONS

Jackson Eng, and Noel J. Gaspar, both of Sarnia, Canada, assignors to Exxon Research and Engineering Company, Linden, N.J.

Filed Dec. 24, 1975, Ser. No. 644,184

Int. Cl.² C10G *37/06*

U.S. Cl. 208—67 21 Claims



1. In a process for hydrotreating a middle distillate petroleum feed stock to saturate olefins present therein as well as remove sulfur and nitrogen compounds therefrom, the improvement which comprises passing said feed stock and steam into a steam hydroconversion zone over a dual-function catalyst comprising molybdenum on a base selected from the group consisting of a chromic oxide and ferric oxide base and on a high surface area alumina base at steam hydroconversion conditions before said feed is passed to a hydrotreating zone, thereby reducing hydrogen requirements in said hydrotreating zone, said steam hydroconversion catalyst being sulfided prior to use.

3,997,428

VAPORIZATION OF OIL FEED BY ADDITION OF REGENERATED CATALYST

George E. McKenna, Borger, Tex., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed May 6, 1974, Ser. No. 467,250

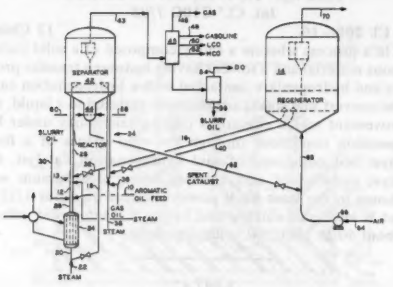
Disclosure was also published under second Trial Voluntary Protest Program on Feb. 3, 1976

Int. Cl.² C10G *37/02, 11/04*

U.S. Cl. 208—78 9 Claims

1. A hydrocarbon conversion process comprising:

combining a first portion of a regenerated silica-containing cracking catalyst at a temperature within the range of about 900° to 1100°F with an oil feed at a temperature of about 50° to 200°F so as to vaporize said oil feed without substantial cracking and bring said feed to a temperature within the range of about 700°–800°F;



thereafter adding additional regenerated catalyst at a temperature within the range of about 1050 to 1350°F to increase the temperature of said oil to a level within the range of about 950 to 1100°F where cracking occurs;

separating the resulting products from spent catalyst produced thereby;

recycling said spent catalyst to a regeneration zone; and

recovering said products.

3,997,429

REFORMING CATALYST

Jay A. Rashkin, Piscataway, N.J., assignor to Cities Service Oil Company, Tulsa, Okla.

Filed Mar. 26, 1971, Ser. No. 128,436

Int. Cl.² C10G 35/08

U.S. Cl. 208—139 7 Claims

1. A catalyst composition for catalytically reforming hydrocarbon feedstock, said composition comprising an alumina support impregnated with minor amounts of platinum, cadmium, and chloride wherein said alumina support is selected from the group consisting of eta alumina, gamma alumina and mixtures thereof, said platinum and cadmium are each in the amount of from about 0.1% wt. to about 3% wt. and the chloride is in the amount of from 0.1% wt. to about 2% wt.

3,997,430

HYDRODESULFURIZATION PROCESS INVOLVING BLENDING HIGH BOILING STREAMS

Robert D. Christman, Penn Hills Township; Joel D. McKinney, Indiana Township; Thomas C. Readal, McCandless Township, and Stephen J. Yanik, Hampton Township, all of Pa., assignors to Gulf Research & Development Company, Pittsburgh, Pa.

Continuation of Ser. No. 346,116, March 29, 1973, abandoned. This application Apr. 16, 1975, Ser. No. 568,555

Int. Cl.² C10G 23/02

U.S. Cl. 208—211 5 Claims

1. A hydrodesulfurization process comprising blending separate non-asphaltic sulfur-containing petroleum hydrocarbon oil fractions each having a volume average boiling point of at least 700° F. to form a blended oil stream, both of said fractions boiling above 1,000° F. but one of said fractions having a boiling range higher than the other, passing said blended stream together with hydrogen downflow over a fixed bed of hydrodesulfurization catalyst comprising Group VI and Group VIII metals on a non-cracking alumina support to remove at least 80 weight percent of the sulfur from said blended stream, and regulating the amount of hydrodesulfurization catalyst in the bed to avoid excessively decreasing the boiling characteristics of the blended oil stream whereby an increase in the temperature differential between the 10 and 90 percent boiling points of the blended stream occurs but does not exceed 20° F., while the 90 percent boiling point of the blended stream is decreased at least 10° F.

3,997,431

HYDRODESULFURIZATION PROCESS EMPLOYING A TITANIUM PROMOTED CATALYST

Harold Beuther, Gibsonia; Sun W. Chun, Murrysville, and Angelo A. Montagna, Monroeville, all of Pa., assignors to Gulf Research & Development Company, Pittsburgh, Pa.

Continuation-in-part of Ser. No. 278,959, Aug. 9, 1972, Pat. No. 3,840,433. This application July 24, 1974, Ser. No. 491,233

Int. Cl.² C10G 23/02

U.S. Cl. 208—216 19 Claims

1. A process for the hydrodesulfurization of a sulfur-containing hydrocarbon stock selected from the group consisting of naphtha and heavier hydrocarbons which comprises contacting the hydrocarbon stock with hydrogen and a catalyst substantially free of phosphates and consisting essentially of a hydrogenating metal selected from Group VI and a hydrogenating metal selected from Group VIII, both hydrogenating metals being in the sulfided form, supported on a non-zeolitic refractory oxide carrier and promoted with from about 1 to about 10 weight per cent of a Group IV-B metal by the addition of the Group IV metal to said carrier after calcination of said carrier, the contacting being conducted at a temperature from about 500° F. to about 1,000° F., a pressure from about 100 to about 5,000 PSIG, a liquid hourly space velocity from about 0.25 to about 10.0 volumes of hydrocarbon stock per volume of catalysts per hour and a hydrogen feed rate from about 500 to about 10,000 standard cubic feet of hydrogen per barrel of hydrocarbon stock.

3,997,432

CONTINUOUSLY ADJUSTING THE INDEX OF FILTRABILITY OF A GAS OIL FRACTION

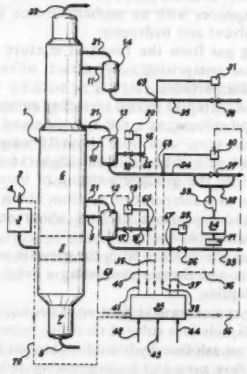
Bernard Louvel, Versailles, and Bernard Vourron, Oullins, both of France, assignors to Institut Francais du Petrole, des Carburants et Lubrifiants et Entreprise de Recherches et d'Activities Petrolieres Elf, Paris, France

Filed May 27, 1975, Ser. No. 581,348

Claims priority, application France, May 30, 1974, 74.18870

Int. Cl.² C10G 7/00

U.S. Cl. 208—354 3 Claims



1. A method for continuously adjusting the index of filtrability of a gas oil withdrawn from an atmospheric distillation column comprising withdrawing a stream of gas oil from said column, measuring the index of filtrability of the stream by

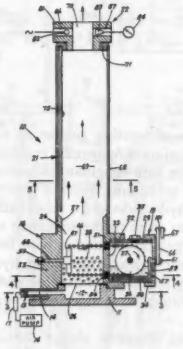
means of an analyzer to provide a representative signal, measuring the flow rate of the gas oil stream to provide a representative signal, measuring the rate of withdrawal of a stream from the column above said gas oil stream to provide a representative signal, measuring the flow rate of the crude petroleum being supplied to said column to provide a representative signal, measuring the flow rate of the vapor employed for stripping the withdrawal streams of the gas oil and of the product withdrawn from the column immediately below said gas oil stream to provide representative signals, providing a signal representative of the slope of the distillation curve of the crude petroleum in the gas oil zone, feeding all of said foregoing signals to a control unit, processing the signals to provide a control signal and utilizing said control signal to control the rate of withdrawal of said gas oil stream from said column to thereby control the index of filtrability of said gas oil.

3,997,433

METHOD AND APPARATUS FOR GENERATING DRY DUST PARTICLES

Benjamin Y. H. Liu, 3005-36th Ave., NE., Minneapolis, Minn. 55418, and Virgil A. Marple, 35 N. Teakwood Lane, Minneapolis, Minn. 55441

Filed July 18, 1975, Ser. No. 597,235
Int. Cl.² B03B *1/00*
U.S. Cl. 209—5 **41 Claims**



31. A method of generating dust from powder material comprising: moving a chain carrying powdered material into a bed of beads, supplying a stream of gas, and moving said stream of gas through said bed of beads to fluidize the bed of beads and entrain the powdered material in the bed of beads in the moving gas.

3,997,434

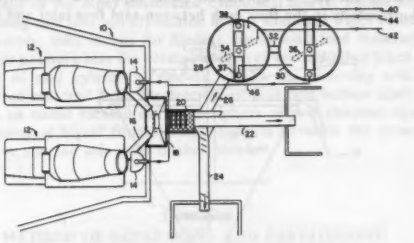
CONCRETE RECLAMATION SYSTEM

Irving P. Macauley, Jr., Clinton, Conn., assignor to Jetomatic Systems, Inc., Guilford, Conn.

Filed Sept. 4, 1975, Ser. No. 610,330
Int. Cl.² B03B *7/00*
U.S. Cl. 209—10 **15 Claims**

1. In a method for the reclamation of unpoured concrete wherein concrete is separated into aggregate, sand and cement slurry fractions, the improvements comprising:

maintaining said slurry in suspension in a vessel by agitation; circulating said slurry in a loop to a point near where concrete mixers are located and back into said vessel; and



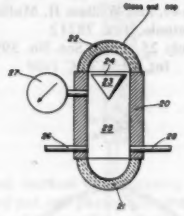
periodically opening said loop and supplying said slurry to said mixers as part of the charge to same.

3,997,435

METHOD FOR SELECTING HOLLOW MICROSPHERES FOR USE IN LASER FUSION TARGETS

Eugene H. Farnum; R. Jay Fries, both of Los Alamos, N. Mex.; Jerry W. Havenhill, Independence, Mo.; Maurice Lee Smith, Kansas City, Mo., and Daniel L. Stoltz, Blue Springs, Mo., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Oct. 29, 1975, Ser. No. 626,953
Int. Cl.² B07B *15/00*
U.S. Cl. 209—10 **8 Claims**



8. A method for separating hollow microspheres according to their density which comprises (a) placing a mixture of hollow microspheres of varying density in an elongate pressure tight vessel having its elongate axis disposed vertically and having an inverted hollow conical vessel disposed therein on said axis and near the top of said elongate vessel, the mouth of said conical vessel forming a narrow annulus with the wall of said elongate vessel, (b) pressurizing said elongate vessel with gaseous SF_6 to a pressure at which hollow microspheres of less than a certain density float through said annulus to the top of said elongate vessel, (c) lowering the pressure of said SF_6 in said vessel whereby said less dense hollow microspheres are deposited in said hollow inverted conical vessel, and (d) removing the hollow microspheres in said conical vessel from said elongate vessel.

3,997,436

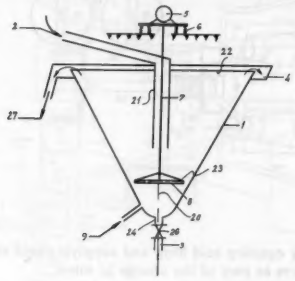
APPARATUS FOR CLEANING FLOCCULATED SLIME AND OTHER MATERIAL

Stoycho Mitrev Stoev, and Roza Tzvetanova Kintsheva, both of Sofia, Bulgaria, assignors to Vish Minno-Geoloshki Institute-Nis, Sofia, Bulgaria

Filed June 10, 1975, Ser. No. 585,530
Int. Cl.² B03B *5/12, 5/22*
U.S. Cl. 209—426 **3 Claims**

1. In an apparatus for cleaning flocculated material in the form of a liquid-borne suspension, a conical precipitator hav-

ing a vertical axis and a bottom outlet, first inlet pipe means disposed at the upper end of the precipitator for introducing the liquid-borne material into the precipitator to flow downwardly therein, an apertured plate supported substantially horizontally in the flow path between said first inlet and said



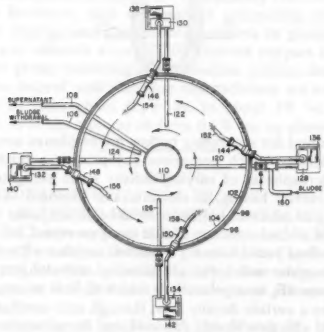
bottom outlet, a discharge pipe communicating with the bottom outlet of the precipitator, an annular chute coupled to and disposed around the top rim of the precipitator, second inlet pipe means disposed in the lower portion of the precipitator for introducing liquid therein, and means for mechanically vibrating the plate at a specified rate.

3,997,437

AEROBIC TYPE SEWAGE DIGESTION SYSTEM

Jack E. Prince; Franklin E. Terry, both of 2927 31st St., Port Arthur, Tex. 77640, and William H. Mullins, 230 W. Kings Highway, San Antonio, Tex. 78212

Filed July 25, 1975, Ser. No. 599,133
Int. Cl.² C02C *1/08*
U.S. Cl. 210—4 **16 Claims**



1. In a waste treatment facility for decomposing waste substance comprising:

headworks for receiving sewage containing waste substance, said headworks having screening means;

flow means for said waste treatment facility to allow said sewage to flow therethrough;

a primary stage for receiving sewage from said headworks including a primary clarifier, said primary clarifier receiving sewage from said headworks via said flow means, said primary clarifier allowing sludge which includes concentrated waste substance to settle to the bottom and be withdrawn to a sludge digester via said flow means;

a secondary stage for receiving overflow from said primary clarifier including filter means receiving said overflow via said flow means and additional clarifier means for further treatment of sewage received from said filter means via said flow means before discharge of liquids separated therefrom;

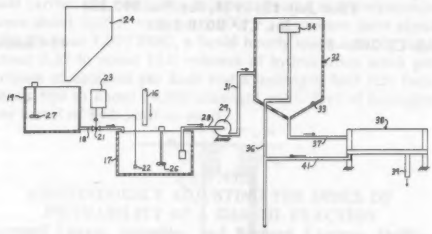
said sludge digester including pump means for continually circulating sludge in said sludge digester through first conduit means, an aerator that immediately discharges above the level of said sludge into said sludge digester, means for controllably adding sludge to said sludge digester through said aerator, a supernatant overflow being discharged from the sludge digester through a stilling well located in said sludge digester and an appropriate overflow conduit connected thereto, said sludge digester having means for periodically withdrawing digester sludge from said sludge digester after a short settling time.

3,997,438

PROCESS OF TREATING GELATINOUS SLUDGE AGGLOMERATIONS

Henry J. Weiland, Birmingham, and Dewey W. Black, Tarrant City, both of Ala., assignors to Environment Improvement Systems, Inc., Birmingham, Ala.

Filed Nov. 17, 1975, Ser. No. 632,291
Int. Cl.² C02C *5/02*
U.S. Cl. 210—42 R **4 Claims**



1. In the process of treating gelatinous sludge agglomerations containing aluminum hydroxide resulting from the clarification of raw water with coagulants wherein the treated raw water is allowed to settle into layers of gelatinous sludge containing aluminum hydroxide and a supernatant effluent comprising the following steps in the sequence named:

a. reacting said gelatinous sludge with lime in an amount required to react with said aluminum hydroxide to form a precipitate and produce a filterable sludge in water,

b. settling said filterable sludge in the water carrying the same,

c. separating said filterable sludge thus settled from the water carrying the same, and

d. passing said filterable sludge through filter means to separate solids from liquid.

3,997,439

METHOD OF PURIFICATION OF WASTE WATER BY TREATMENT WITH ZIRCONIUM SALT

Buichiro Ayukawa, Musashino, Japan, assignor to Shikoku Paper Mfg. Co., Ltd., Japan

Filed Nov. 1, 1974, Ser. No. 519,866
Claims priority, application Japan, Nov. 7, 1973, 48-125118
Int. Cl.² C02C *5/04*; **C02B** *1/20*
U.S. Cl. 210—50 **15 Claims**

1. A method of purification of waste water from paper mills which comprises adding an aqueous solution of $ZrOCl_2.8H_2O$ to said waste water, mixing adjusting the pH to 4.5–6.8, whereby coagulation and precipitation of suspended substances and colloidal dispersed particles occurs and non-colloidal dissolved, low molecular weight organic substances form insoluble precipitates or chelates and removing said precipitates and chelates.

3,997,440

POLLUTED WATER PURIFICATION

E. O. Box, Jr., and Floyd Farha, Jr., both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Apr. 1, 1976, Ser. No. 672,826
Int. Cl.² B01J 11/22; C02B 1/34
U.S. Cl. 210—63 R 12 Claims

1. A process for the purification of aqueous streams containing organic material impurities dissolved and/or suspended therein to aqueous products substantially free of organic material which comprises contacting an aqueous stream containing oxidizable organic pollutant impurities and an oxygen-containing gas with a solid copper manganite spinel structure catalyst promoted with at least one Group II metal in which the atomic ratio of copper to manganese varies from about 0.25:1 to about 4:1 and Group II promoter metal to manganese varies from about 0.02:1 to about 4:1 under oxidation conditions including a temperature and a ratio of water to oxygen sufficient to convert said organic materials to innocuous materials so that said aqueous stream which has been substantially freed of said contaminating impurities can be safely discarded or reused.

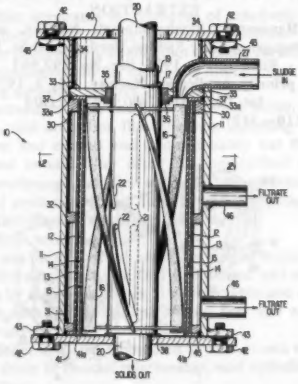
9. A catalyst composition consisting essentially of copper manganite promoted with at least one metal selected from Group IIA and Group IIB metals in which the atomic ratio of copper to manganese varies from about 0.25:1 to about 4:1 and the promoter metal to manganese varies from about 0.02:1 to about 4:1.

3,997,441

PRESSURE FILTER SEPARATOR

Lee F. Pamplin, Jr., 1601 Sweet Apple Court, Birmingham, Ala. 35243

Filed Apr. 21, 1975, Ser. No. 569,875
Int. Cl.² B01D 37/02
U.S. Cl. 210—75 8 Claims



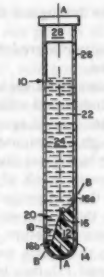
1. A filter separator for continuously filtering a liquid-solid feed material, comprising: a cylindrical chamber having enclosing top, bottom and side walls; an inner and an outer perforated cylindrical sleeve, said sleeves being mounted coaxially within said chamber in a spaced relationship; a filter media attached to and extending around the entire inner surface of said outer sleeve, said filter media being of a thickness such that a space remains between the filter media and the inner sleeve; a volume of precoat material in said space between the filter media and the inner sleeve, said precoat material being collected on the inner side of the filter media and filling said space and the perforations in the inner sleeve; a first spirally-slotted hollow shaft rotatably mounted coaxially within said chamber, said first shaft having at least one spirally-slotted portion for passage of solid filtered material; a wiper blade assembly having at least on wiper blade mounted on said first shaft, said wiper blade extending in a spiral around said first shaft and being of a size and construction sufficient to constantly move collected solid material off of the interior surface of the inner perforated cylindrical sleeve; means for rotating said first spirally-slotted hollow shaft and wiper blade assembly; inlet means for feeding liquid-solid feed material under pressure into the central portion of said chamber interiorly of said cylindrical sleeves; means for removing solid filtered material from the interior of said first hollow shaft; and an outlet located on the periphery of said chamber for removal of liquid filtrate which collects between the outer sleeve and the side walls of the chamber.

3,997,442

METHOD OF SEPARATING AND PARTITIONING DIFFERING DENSITY PHASES OF A MULTIPHASE FLUID

Joseph F. Gigliello, and Harry A. Kragle, both of Corning, N.Y., assignors to Corning Glass Works, Corning, N.Y.

Continuation-in-part of Ser. No. 452,059, March 18, 1974, Pat. No. 3,920,549. This application Sept. 15, 1975, Ser. No. 613,076
Int. Cl.² B01D 21/26
U.S. Cl. 210—83 1 Claim



1. An improved method of separating blood into a light phase and a heavy red cell phase including the steps of, positioning a quantity of thixotropic material at a closed bottom end of a tubular container, said material being chemically inert with respect to blood and having a specific gravity intermediate the specific gravities of the phases of blood to be separated; introducing into said container a quantity of blood to be separated; subjecting said blood and said thixotropic material to a centrifugal force to urge said blood to separate into a light phase and a heavy red cell phase and to simultaneously move said material to a position between said phases; and after said phases are separated and a substantial amount of said material has formed a partition between said separated phases, terminating the centrifugal force, wherein the improvement comprises the steps of,

initially positioning said thixotropic material asymmetrically across said closed bottom end and upwardly along a sidewall adjacent said bottom end such that said thixotropic material has an upper surface which is upwardly and sideways inclined relative to the sidewall of the container to form a blood-receiving space between upper and lower extremities of said upper surface and an opposing sidewall portion adjacent said upper surface; and

during the step of applying centrifugal force, urging the heavy red cell phase downwardly toward said closed end and into said blood-receiving space, and simultaneously moving said thixotropic material from the upper extremity of said material upwardly through peripheral portions of the blood along a portion of said container sidewall, whereby the thixotropic material will move rapidly from

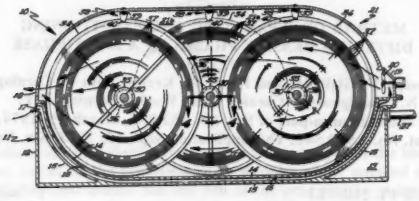
its initial position and flow through the periphery of the blood with minimal hemolysis of red cells due to collision of the downwardly moving heavy red cell phase and the upwardly moving thixotropic material.

3,997,443

APPARATUS FOR BIOLOGICAL TREATMENT OF WASTE WATER

Christopher Thissen, Austin, Minn., assignor to Geo. A. Hormel & Co., Austin, Minn.

Filed Aug. 21, 1975, Ser. No. 606,589
Int. Cl.² C02C 1/04
U.S. Cl. 210—150 6 Claims



1. Apparatus for the biological treatment of waste water comprising:

a tank adapted to contain a predetermined volume of waste water to be treated,

an inlet interconnecting the tank with a source of waste water, an outlet connected with said tank,

a plurality of elongate spaced apart driven shafts extending transversely through and mounted on said tank,

a plurality of similar biological discs mounted on each shaft for rotation therewith, each of said discs having ribs on opposed surfaces thereof projecting therefrom, said discs being emerged in the waste water to approximately one-half their respective diameters, the spacing between said shafts being such that discs on adjacent shafts are disposed in overlapped relation to approximately one-half their respective diameters, a plurality of over-lapped discs being positioned in each compartment, each disc having a hub affixed to said shaft, the hub of each disc having outwardly opening annular recesses therein receiving therein the peripheral portions of the lapped disc on the next adjacent shaft,

means for rotating said shaft and the associated discs in the same or opposite direction in a predetermined velocity whereby the surface of the discs are alternately exposed to the waste water and the atmosphere at an interval to permit the growth of aerobic material on the surface of the discs.

3,997,444

SEWAGE SETTLING TANK

Robert F. McGivern, Columbus, Ohio, assignor to Sybron Corporation, Rochester, N.Y.

Filed Mar. 15, 1976, Ser. No. 667,023
Int. Cl.² B01D 21/24
U.S. Cl. 210—242 R 5 Claims

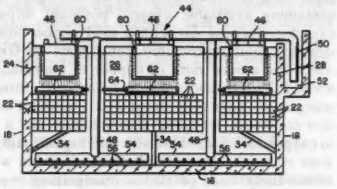
1. A sewage settling tank comprising:

a. a bottom and upstanding end and side walls forming a settling chamber to permit the settling of sludge on said bottom from liquid in said tank, an inlet at one end of said tank for the liquid to be treated and a clarified water outlet;

b. at least two banks of tube settlers in said tank, said banks being arranged side by side in a horizontal plane spaced above said bottom;

c. baffle means upstanding from about the periphery of each bank to define a clear water zone directly above each bank, said outlet communicating with said clear water zone and defining the level of liquid in said tank which is above said banks of tube settlers and below the upstanding edge of said baffle means so that the flow of liquid is from said inlet up through said tube settlers and into said clear water zone, said baffle means having an opening in the upstream side thereof which extends below the liquid level as defined by said outlet;

d. seal means for said opening to prevent the direct flow of



liquid from said inlet through said opening and into said clear water zone;

e. a floating carriage adapted to pass through said opening and seal means; and

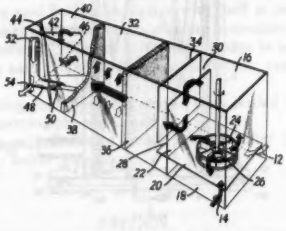
f. a sludge removal siphon carried by said carriage, said siphon having its inlet leg extending over said baffle means and down between said side by side banks of tube settlers, the lower most end of said inlet leg having horizontal branches extending laterally beneath said banks to remove sludge settling said tank bottom from said tube settlers.

3,997,445

APPARATUS FOR LIQUID-LIQUID COUNTERCURRENT EXTRACTION

Gunnar Hannestad, Skedsmokorset, Norway, assignor to Forskningsgruppe For Sjeldne, Jordarter, Oslo, Norway

Filed July 3, 1975, Ser. No. 592,901
Claims priority, application Norway, July 3, 1974, 742415
Int. Cl.² B01F 7/00; B01D 11/04
U.S. Cl. 210—319 10 Claims



1. Apparatus for use in countercurrent extraction of a dissolved material from a first liquid phase to a second liquid phase immiscible with said first liquid phase comprising in sequence:

a. means for combining and mixing the two liquid phases; and

b. a settling chamber for permitting separation of the two immiscible liquids comprising

c. a remote end for separate removal of the two immiscible liquids, said remote end including a first partition sealing off a first portion thereof and a second partition sealing off a second portion thereof separate from the first portion, the first portion and the second portion each having an outlet, the height of the first partition being greater

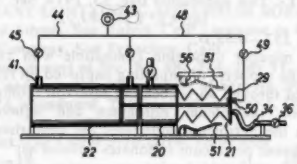
than the height of the second partition, a tube being provided in the remote end having a first end positioned in the remote end outside the first sealed off portion and a second end positioned above the first end within the first sealed off portion and positioned slightly lower than the height of said first partition during normal apparatus operation.

3,997,446

FILTER APPARATUS WITH AN ACCORDION-TYPE FILTER MEDIUM FOR COMPACTION AND REMOVAL OF SLUDGY FILTER CAKE

Masatsugu Nagakura, 719 Aza-Shimoshibaharasoe, Umena, Mishima, Shizuoka, Japan

Filed Feb. 23, 1976, Ser. No. 660,409
Int. Cl.² B01D *29/02*
U.S. Cl. 210—350 11 Claims



1. A filter apparatus for removal of relatively fine solid particles from a fluid, comprising in combination:

a. a filter drum having a fluid inlet opening therethrough for the introduction of the fluid to be filtered, said filter drum having an open end and a closed end;

b. an accordion filter medium mounted within said filter drum, said accordion filter medium including:

1. first and second end plates slidably but fluid-tightly fitted in said filter drum for longitudinal movement therethrough, said first end plate being normally held at said open end of said filter drum and having a filtrate outlet opening therethrough;

2. a filter screen; and

3. means for supporting said filter screen in the form of a bellows between said first and second end plates;

whereby said filter screen is contractable and expansible as desired with the movement of said first and second end plates toward and away from each other;

c. a cylinder actuator connected to said closed end of said filter drum in coaxial relationship, said cylinder actuator including:

1. at least one piston; and

2. at least one piston rod connected at one end to said piston and at the other end to said first end plate of said accordion filter medium by slidably extending through said closed end of said filter drum and said second end plate;

whereby said cylinder actuator is capable of causing said first and second end plates to move toward each other for compaction of filter cake on said filter screen and of causing said accordion filter medium to move out of said open end of said filter drum for removal of the compacted filter cake, said filter screen being expanded upon movement of said accordion filter medium out of said open end; and

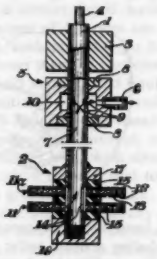
d. means for removing the compacted filter cake from said filter screen upon movement of said accordion filter medium out of said open end of said filter drum.

3,997,447

FLUID PROCESSING APPARATUS

Ernest J. Breton, Wilmington, and Dexter Worden, Newark, both of Del., assignors to Composite Sciences, Inc., Newport, Del.

Filed June 7, 1974, Ser. No. 477,490
Int. Cl.² B01D *33/24*
U.S. Cl. 210—360 A 10 Claims



1. A fluid processing apparatus for filtering suspended matter from fluid medium comprising:

a hollow shaft,

a fluid processing device mounted on one end of said shaft comprising at least one porous element having an outer porous processing layer and an inner porous supporting and distributing layer, said porous layers having relatively large planar surfaces joined by smaller edge surfaces, said layers being contacted and bonded over one of their large planar surfaces, the pores in said layers being in open communication over substantially all of the interface of the contacting surfaces so that fluid medium can pass from one layer to the other, the pores in the outer processing layer being smaller than the pores in the inner supporting and distributing layer, the outer porous processing layer being formed from sintered particulate material and having a smooth outer surface, said porous element being mounted on a means for attaching the porous element to the hollow shaft so that fluid medium can pass from the interior of the porous element to the interior of the hollow shaft, said inner supporting and distributing layer being confined within the porous element so that when the porous element is immersed in a body of fluid medium, the supporting and distributing layer communicates with the body of fluid medium only through the outer processing layer,

a means for imparting rotary motion to the hollow shaft and fluid processing device during the filtering operation,

a conduit providing a fluid path between the interior and the exterior of the hollow shaft at a point remote from the point of attachment of the fluid processing device to the hollow shaft, thereby providing a continuous fluid path from the exterior of the fluid processing device, through the processing layer, through the inner supporting and distributing layer, through the hollow shaft and through the conduit to a point remote from the fluid processing device,

a means for applying a pressure differential to the conduit during the filtering operation to cause a flow of fluid medium from the exterior of the fluid processing device, through the processing layer, through the inner supporting and distributing layer, through the hollow shaft and through the conduit, and

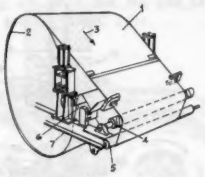
a means for periodically reversing the pressure differential during the filtering operation thereby reversing the flow of fluid medium at a rate in excess of ten times per hour and sufficient to reduce the tendency for suspended matter being filtered to collect on and in the porous processing layer.

3,997,448

FILTER ARRANGEMENTS

Eric Woodland, Langham, England, assignor to GEC Diesels Limited, Merseyside, England

Filed May 22, 1975, Ser. No. 579,858
Claims priority, application United Kingdom, June 4, 1974, 24671/74
Int. Cl.[2] B01D 33/04
U.S. Cl. 210—400 4 Claims



1. A travelling band filter arrangement comprising a plurality of rollers including a drum roller and at least one other roller, and a continuous filter band carried by said rollers, said filter band including two tension bands, one of said rollers having four portions of helical thread formation around its surface, said portions comprising two pairs, the portions of each pair being separated by a respective smooth portion of roller surface which is engaged by a respective one of said tension bands when said filter band is running centrally on said one of said rollers, said portions of each pair being of opposite hand which, in relation to the direction of rotation is such as to impose a transverse bias on the respective tension band tending to return it to its respective smooth portion of roller surface in the event of its drifting in either direction therefrom.

3,997,449

LOW VISCOSITY FLAME RETARDANT

Theodore C. Wilkinson, Ann Arbor, Mich., assignor to Michigan Chemical Corporation, Chicago, Ill.

Filed Sept. 29, 1975, Ser. No. 617,794
Int. Cl.[2] C09K 3/28; C08J 9/16
U.S. Cl. 252—8.1 10 Claims

1. A low viscosity flame retardant comprising from about 5 percent to about 40 percent 2,3-dibromopropanol and from about 60 percent to about 95 percent tris(2,3-dibromopropyl)phosphate.

6. A polymeric composition comprising a polyurethane polymer and a flame retarding amount of a low viscosity flame retardant of claim 1.

3,997,450

SYNTHETIC FIBERS OF ENHANCED PROCESSABILITY

William G. Steinmiller, Charlotte, N.C., assignor to Fiber Industries, Inc., Charlotte, N.C.

Continuation-in-part of Ser. No. 242,776, April 10, 1972, abandoned. This application Mar. 15, 1974, Ser. No. 451,631
Int. Cl.[2] D06M 11/12
U.S. Cl. 252—8.7 12 Claims

1. A synthetic fiber finish composition consisting essentially of: (1) an emulsifier comprising an alkylene (lower) oxide condensate of a synthetic ester of a branched or straight chain, saturated or unsaturated, aliphatic C_3–C_{18} alcohol and a branched or straight chain, saturated or unsaturated, aliphatic C_8–C_{18} mono- or di-carboxylic acid; an alkylene oxide condensate of a polyhydric aliphatic C_6–C_{18}, branched or straight chain, saturated or unsaturated, alcohol, or partial ester thereof with said aliphatic C_8–C_{18} mono- or di-carboxylic acid, branched or straight chain, saturated or unsaturated; an alkylene oxide condensate of a long chain, branched or straight chain, saturated or unsaturated, aliphatic C_6–C_{18} monohydric alcohol; an alkylene oxide condensate of an amide derived from an alkanol (lower) amine and a long chain saturated or unsaturated, branched or straight chain, aliphatic C_8–C_{18} mono- or di-carboxylic acid; or an alkylene oxide condensate of an alkyl (C_6–C_{18})-substituted, hydroxy-terminated aryl; or a mixture of these; (2) a lubricant comprising a mono- or diester of an aliphatic C_6–C_{18}, branched or straight chain, saturated or unsaturated, carboxylic acid with a monohydric aliphatic alcohol C_3–C_{18}, branched or straight chain, or a refined mineral, animal or vegetable oil; said emulsifiers containing up to about 50 moles of alkylene oxide per mole of ester, alcohol, or amide and the reactive hydroxyl sites of said emulsifiers containing deactivating end cap groups selected from the group consisting of methyl, acetyl, sulfate, the residue of a fatty acid (C_8–C_{18}), phosphate, and mixtures thereof and (3) as an emulsifier-stabilizer component, a small but effective amount of an alkali salt of a dialkyl sulfosuccinic acid.

3,997,451

SULFONATE BLENDS USEFUL FOR IMPROVED OIL RECOVERY

Mark A. Plummer, and Wayne O. Roszelle, both of Littleton, Colo., assignors to Marathon Oil Company, Findlay, Ohio

Division of Ser. No. 387,413, Aug. 10, 1973, Pat. No. 3,901,317. This application Dec. 23, 1974, Ser. No. 535,531
Int. Cl.[2] E21B 43/22
U.S. Cl. 252—8.55 D 8 Claims

1. A micellar dispersion compatible with crude oil and having the property of imparting improved oil recovery when displaced through an oil-bearing reservoir, comprised of hydrocarbon, petroleum sulfonates and aqueous medium wherein the petroleum sulfonates are comprised of at least two different petroleum sulfonates defined as:

1. each sulfonate having an average equivalent weight within the range of about 395 to about 440,
2. each sulfonate having an aliphatic to aromatic proton ratio within the range of about 4 to about 20 moles/mole, but,
3. the sulfonates having different aliphatic to aromatic proton ratios of a magnitude of at least about 2.5 moles/mole.

3,997,452

CRYSTAL MODIFIED DEPOSITION OF HYDRATED METAL OXIDE

Edwin A. Richardson, Houston, and John A. Herce, Midland, both of Tex., assignors to Shell Oil Company, Houston, Tex.

Filed May 5, 1975, Ser. No. 574,770
Int. Cl.[2] E21B 33/138, 43/04
U.S. Cl. 252—8.55 R 4 Claims

1. In a process for coating a solid mass of particles in or around a subterranean portion of the borehole of a well with a relatively strongly adherent hydrated aluminum oxide coating by flowing an aqueous liquid solution of an alkali metal aluminate and a pH-reducing reactant of the group consisting of urea, formamide and dimethyl formamide capable of subsequently lowering the pH of the solution to one at which a hydrated aluminum oxide is precipitated after the solution has flowed into contact with the solid material so that the solid material is contacted by the solution while a hydrated aluminum oxide is being precipitated from the solution, the improvement which comprises:

including within the solution, before flowing it into said contact, an effective amount of from about 0.05 to 2.4 moles per liter of hydroxyorganic crystal modifier of the group consisting of lignins, tannins and glycerols having a concentration such that its presence increases the layering of the precipitated hydrated aluminum oxide coating without unduly weakening the adherene of the coating.

3,997,453

SOFTENER DISPERSION

Harold E. Wixon, New Brunswick, N.J., assignor to Colgate-Palmolive Company, New York, N.Y.

Continuation-in-part of Ser. No. 441,587, Feb. 11, 1974, abandoned, which is a continuation of Ser. No. 250,427, May 4, 1972, abandoned. This application July 11, 1975, Ser. No. 595,104

Int. Cl.² D06M *13/32, 13/46*

U.S. Cl. 252—8.75 9 Claims

1. A stable, cold water dispersible fabric softening composition comprising from about 60 to 20% by weight of a cationic quaternary ammonium softener as the sole fabric softening agent, an organic, anionic sulfonate, the weight ratio of cationic softener to anionic detergent being from about 40:1 to 5:1, and wherein the anionic sulfonate is selected from the group consisting of:

1. an unsubstituted benzene or naphthalene sulfonate,
2. a mono-C_1 to C_{20} alkyl substituted benzene or naphthalene sulfonate,
3. a polyalkyl substituted aromatic sulfonate with one alkyl group having a maximum of 18 carbons and each of the remaining alkyl groups having a maximum of 2 carbons and
4. olefin and paraffin sulfonates containing from about 8 to 20 carbon atoms, and mixtures thereof, and water.

3,997,454

LUBRICANT CONTAINING POTASSIUM BORATE

John Howard Adams, San Rafael, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Continuation-in-part of Ser. No. 483,274, July 11, 1974, abandoned, and a continuation-in-part of Ser. No. 505,130, Sept. 11, 1974, abandoned. This application June 4, 1975, Ser. No. 583,723

Int. Cl.² C10M *3/18, 5/14, 7/20, 7/24*

U.S. Cl. 252—18 24 Claims

1. A lubricating oil containing dispersed therein from 2.5 to 25 weight percent, based on the weight of the composition, of a particulate hydrated potassium borate having a mean particle size less than 1 micron and having a boron-to-potassium ratio of 2.5 to 3.5.

2. The lubricating oil defined in claim 1 wherein an oil-soluble alkali or alkaline earth metal sulfonate dispersant is also present.

3,997,455

PARAFFINIC BASE GREASES

Francis S. Sayles, Rocky Hill, N.J., assignor to Mobil Oil Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 484,909, July 1, 1974, Pat. No. 3,904,534. This application June 26, 1975, Ser. No. 590,760

Int. Cl.² C10M *5/16, 5/28*

U.S. Cl. 252—36 26 Claims

1. A lubricating grease comprising (i) a predominantly paraffinic lubricating vehicle, (ii) a thickener comprising a calcium or calcium/lead complex soap and (iii) an organic terpolymer improver which comprises (1) at least 65%, by weight, of ethylene, (2) at least 5%, by weight, of a second ethylenically unsaturated monomer which is an ester of the group consisting of: the vinyl esters of saturated aliphatic carboxylic acids having 1–6 carbons; the alkyl acrylates, the alkyl methacrylates, the dialkyl maleates and the dialkyl fumarates of aliphatic alcohols having 1–6 carbons; and (3) 0.01 to 3%, by weight of a third ethylenically unsaturated monomer of the group consisting of: acrylic, methacrylic, itaconic, maleic, and fumaric acids; the anhydrides of itaconic, maleic and fumaric acids; the alkyl hydrogen maleates and the alkyl hydrogen fumarates; the monoacrylates and monomethacrylates of glycols; 2-hydroxy-3-aminopropyl allyl ether, allyl glycerol ether, divinyl glycol, 2-dimethylaminomethyl acrylate, 2-dimethylaminoethyl methacrylate and N-vinyl pyrrolidone.

3,997,456

WIDE LATITUDE TONER

Charles J. Voss, Addison, and Theodore Nykiel, Chicago, both of Ill., assignors to Bell & Howell Company, Chicago, Ill.

Continuation-in-part of Ser. No. 304,030, Nov. 6, 1972, abandoned. This application Oct. 11, 1974, Ser. No. 513,970

Int. Cl.² G03G *9/12*

U.S. Cl. 252—62.1 L 6 Claims

1. A liquid developer for rendering visible in the reverse sense electrostatic patterns contained on a surface in the form of negative electrostatic charges of varying intensity which developer consists of a carrier liquid having an electrical volume resistivity in excess of 10^9 ohm cm and a dielectric constant of less than 3, said liquid carrier having suspended therein non-resinated toner pigment particles to be deposited electrostatically upon said surface, said liquid carrier having dissolved therein a sensitizing agent selected from the group consisting of ½% to 20% inclusive over-based calcium sulphonate in isoparaffinic hydrocarbon solvent, and 15% to 25% inclusive nitrogen substituted long chain alkenyl succinamide in isoparaffinic hydrocarbon solvent, said toner particles including phthalocyanine green, carbon black, and thioindigoid red, and having a negative polarity whereby said toner particles are attracted to the area on said surface of no less than miximum intensity of said electrostatic charge such that toner deposition takes place onto areas defined by said electrostatic pattern where the intensity of said negative electrostatic charges has been reduced or is zero by exposure to electromagnetic radiation, wherein said toner particles are milled in the presence of said sensitizing agent, and a long oil soya modified pentaerythritol alkyd resin, whereby said toner particles become dispersed and have adsorbed thereon a film of said sensitizing agent.

3,997,457

CERAMIC DIELECTRIC COMPOSITION

Koji Takahashi; Norishige Yamaguchi; Makoto Hori, and Yoshiaki Sugimura, all of Tokyo, Japan, assignors to TDK Electronics Company, Limited, Tokyo, Japan

Filed Mar. 2, 1976, Ser. No. 663,132

Claims priority, application Japan, Mar. 5, 1975, 50-26613

Int. Cl.² H01B *3/12;* H01G *4/12*

U.S. Cl. 252—63.5 9 Claims

1. A ceramic dielectric composition consisting essentially of sintered metal oxide mixture expressed by the formula:

$$[(Ba_{1-x}Me_x)O]_z \cdot [(Ta_{1-y}Nb_y)_2O_5]_v \cdot [Bi_2O_3]_z$$

where Me is at least one divalent metal selected from the group consisting of lead and strontium, and x, y, z, u and v are numbers falling within the following ranges

$$0.05 \leq x \leq 0.80,$$

$$0.05 \leq y \leq 0.30,$$

$$0.10 \leq z \leq 0.80,$$

$$0 \leq u \leq 1.00,$$

$$0 \leq v \leq 1.00 \text{ and}$$

$$+ y + z = 1.0$$

7. The ceramic dielectric composition according to claim 1 which further comprises at least one metal oxide selected from the group consisting of oxides of titanium, chromium, molybdenum and tungsten in an amount of not larger than 4.0% by weight based on the weight of the ceramic dielectric composition of said formula and expressed in terms of the amount of titanium dioxide (TiO_2), chromic oxide (Cr_2O_3), molybdenum trioxide (MoO_3) and tungsten trioxide (WO_3), respectively.

3,997,458

METHOD OF CLEANSING CONTAMINATED WOUNDS AND SURGICAL SCRUB SOLUTIONS FOR SAME

Leonard D. Kurtz, Woodmere, N.Y., assignor to Deknatel, Incorporated, Long Island, N.Y.

Filed Apr. 12, 1974, Ser. No. 460,451
Int. Cl.² C11D 1/72, 3/48
U.S. Cl. 252—89 R 4 Claims

1. In the cleansing of contaminated wounds with a surgical scrub solution, the improvement which comprises employing as the surgical scrub solution an aqueous detergent solution which does not impair the wound's ability to resist infection, consisting of an aqueous solution of at least about 10% by weight of a block copolymer of ethylene oxide and propylene oxide having the structure:

$$HO(C_2H_4O)_a(CH(CH_3)CH_2O)_b(C_2H_4O)_cH$$

wherein the ratio of $(C_2H_4O)_{a+c}$ to b is at least about 4:1, said copolymer having an average molecular weight of about 5,000 to 15,500.

3,997,459

DENTURE CLEANING COMPOSITION

Kenneth David Bogie, Hessle; Noel John Pinto, Hornsea, and Peter Norman Ring, Cottingham, all of England, assignors to Reckitt & Colman Products Limited, London, England

Filed Oct. 28, 1975, Ser. No. 626,044
Claims priority, application United Kingdom, Nov. 8, 1974, 48498/74
Int. Cl.² C11D 7/54, 7/08
U.S. Cl. 252—99 11 Claims

1. A solid denture cleaning composition comprising a tartar dissolving amount of an acidic component which dissolves to provide an acidic solution when the composition is mixed with water and a neutralising component having a protective coating, in an amount such that, when the composition is mixed with water the protective coating is so affected that the neutralising component is released over a period of time to neutralise the initially acid solution to a pH of more than 5.5.

6. A denture cleaning composition as claimed in claim 1 additionally comprising a bleaching agent selected from the group consisting of a salt of the acid H_2SO_5, a perborate salt and a percarbonate salt.

9. A solid cleaning composition for dentures comprising

a. an acidic component selected from the group consisting of sulphamic acid, acetodiphosphonic acid, citric acid, tartaric acid and sodium bisulphate;

b. a sufficient quantity of an acid-neutralising component to neutralise said acidic component selected from the group consisting of a carbonate salt, a bicarbonate salt, a mixture of a carbonate with a bicarbonate salt, and a mixture of bicarbonate salt with a phosphate salt;

c. a protective coating around the acid neutralising component comprising a polymer selected from the group consisting of a sytrene/acrylic ester copolymer, a styrene/allyl alcohol copolymer and a vinyl acetate/versatic ester copolymer, the composition being such that, when the composition is added to water the acidic component dissolves to give an acidic solution, and the protective coating formed around the acid-neutralising component so retards the release of the acid-neutralising agent that, for a period of time, the solution remains sufficiently acidic to remove tartar deposits.

3,997,460

LIQUID ABRASIVE CLEANER

Gloria F. Sirine, Pleasanton; Inesis A. J. Day, Alameda, and Stephen J. Kahn, Walnut Creek, all of Calif., assignors to The Clorox Company, Oakland, Calif.

Filed Apr. 10, 1975, Ser. No. 566,908
Int. Cl.² C11D 1/72, 3/14
U.S. Cl. 252—106 9 Claims

1. A surface-adherent liquid disinfectant cleaner with an abrasive stably and homogeneously dispersed therethroughout useful for removing stains, consisting essentially of:

a mineral acid selected from the group consisting of phosphoric acid, sulphuric acid and hydrochloric acid in an amount which falls within a range from about 2% to about 30%;

a suspending agent comprising from about 0.5% to about 5% hydrophilic silica, sufficient of said suspending agent being used to make the cleaner free-flowing but still viscous enough to adhere to a smooth surface;

a non-ionic poly (oxyalkylene) alcohol surfactant in an amount which falls within the range from about 0.05% to about 5%;

an abrasive agent which is 40 to 400 mesh in size maintained in suspension in an amount which falls within the range from about 2% to about 40%; and

the remainder water, all of said percents being by weight.

3,997,461

METHOD OF PREPARING ANTIFOULANT COATING COMPOSITIONS AND RESULTING PRODUCT

William R. Davie, Hopewell Township, Beaver County, Pa., assignor to Porter Paint Co., Louisville, Ky.

Division of Ser. No. 767,483, Oct. 14, 1968, Pat. No. 3,676,388, which is a continuation-in-part of Ser. No. 574,943, Aug. 25, 1966, abandoned. This application Feb. 28, 1972, Ser. No. 230,137
Int. Cl.² C09D 5/14, 5/16
U.S. Cl. 252—182 16 Claims

1. A component useful in preparing an antifoulant coating composition, said component consisting essentially of a slurry or solution of (1) a toxicant for inhibiting growth of marine organisms, (2) a liquid nitrogen containing compound of the group consisting of polyamines and polyamides capable of acting as a curing agent for epoxy resin, in proportions of 1 to 10 parts by weight of toxicant to each part by weight of said nitrogen containing compound, and (3) a diluent in an amount up to about equal parts percent by weight of toxicant, said toxicant being a solid trialkyltin carboxylate of the general formula

$$(R\,R'\,R''\,Sn)_n\,X$$

in which R, R′ and R″ are alkyl groups of 1 to 8 carbon atoms, X is a carboxylate group and n is 1 or 2, the toxicant being crystallizable from the coating composition as needle-like crystals on standing and being so viscous that when added alone to the base mixing is difficult and being soluble at least to some extent in the curing agent and diluent, whereby when the toxicant and the curing agent are added to the base, mixing therewith is facilitated, said component on being mixed with a base of epoxy resin and aromatic pitch-containing material forming therewith an antifoulant coating composition, the said component being present at the time of mixing as a solution or slurry of the toxicant crystals.

3,997,462

SODIUM CHLORITE CONTAINING GRANULES

Jose Luis Denaeyer, and Willy Kegelart, both of Brussels, Belgium, assignors to Solvay & Cie, Brussels, Belgium

Division of Ser. No. 243,252, April 12, 1972, Pat. No. 3,844,726, which is a continuation-in-part of Ser. No. 106,546, Jan. 14, 1971, abandoned. This application July 25, 1974, Ser. No. 491,956

Claims priority, application Belgium, Apr. 13, 1971, 102099

Int. Cl.² C01B *11/10;* C01D *13/00*

U.S. Cl. 252—187 R 3 Claims

1. Dehydrated sodium chlorite containing granules having an apparent specific weight between 1.3 and 1.45 kg/dm³ and prepared from an aqueous liquid medium containing sodium chlorite by evaporating water from said medium by passing said medium into a fluidized bed drier containing a fluidized bed of particles fluidized with a carrier gas having a temperature at the base of the fluidized bed of from 120° C to less than 180° C, while maintaining in said fluidized bed a constant presence of seeds smaller in size than the required granules and maintaining the temperature in the fluidized bed below 80° C.

3,997,463

NEMATIC LIQUID CRYSTAL COMPOSITION FOR ELECTRO-OPTICAL DISPLAYS

Toshiaki Narusawa; Hirofumi Okuyama, both of Sagamihara; Junjiro Goto, Kobe; Yasuji Isozaki, Tokyo, and Masatoshi Fujimori, Musashino, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Filed Mar. 21, 1975, Ser. No. 560,620

Claims priority, application Japan, Mar. 25, 1974, 49-33743

Int. Cl.² C09K *3/34;* G02F *1/13*

U.S. Cl. 252—299 2 Claims

1. A nematic liquid crystal composition consisting essentially of about 10 to 45 wt% of bis-(p'-n-octyloxybenzylidene)-chloro-p-phenylenediamine (BOCPD) and about 55 to 90 wt% of a mixture of p-methoxybenzylidene-p'-n-butylaniline (MBBA) and p-n-butoxybenzylidene-p'-n-butylaniline (BBBA), said MBBA and BBBA being in a weight ratio of about 40:60 to 70:30 respectively.

3,997,464

PLASTIC LENSES FOR GLASS MELTERS

Robert Jerome Tucker, Hackettstown, N.J., assignor to American Cyanamid Company, Stamford, Conn.

Filed May 15, 1975, Ser. No. 577,973

Int. Cl.² F21V *9/00*

U.S. Cl. 252—300 3 Claims

1. An optical lens comprising a plastic material transmissive to visible light having incorporated therein (1) a copper phthalocyanine trisulfonamide compound in which one hydrogen atom of each amide nitrogen is replaced by a 2-ethylhexloxypropyl radical, (2) the compound 1-hydroxy-4-(p-toluidino)-9,10-anthraquinone and (3) an ultraviolet absorber compound; said copper phthalocyanine trisulfonamide being present in a weight percentage concentration such that multiplied by the thickness of the lens in mils it equals a constant falling within the range of 3.9 to 5.2; said 1-hydroxy-4-(p-toluidino)-9,10-anthraquinone compound being present in a weight percentage concentration such that multiplied by the thickness of the lens in mils it equals a constant falling within the range of 6.5 to 13; and said ultraviolet absorber compound being present in a weight percentage concentration such that multiplied by the thickness of the lens in mils it equals approximately 26.

3,997,465

DEHALOGENATION PROCESS

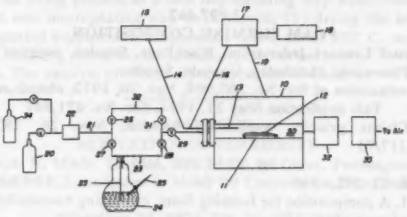
Leonard N. Grossman, Wrightsville Beach, N.C., and Donald A. Brigham, Anderson, Calif., assignors to General Electric Company, San Jose, Calif.

Continuation-in-part of Ser. No. 55,744, July 12, 1970, Pat. No. 3,755,188. This application July 23, 1973, Ser. No. 381,875

The portion of the term of this patent subsequent to Aug. 28, 1990, has been disclaimed.

Int. Cl.² G21C *19/42*

U.S. Cl. 252—301.1 R 12 Claims



1. A method of dehalogenating a composition selected from the group consisting of metallic halides and metallic oxides having halide impurities, oxyhalide impurities and mixtures of halide and oxyhalide impurities, wherein the metallic portion of said metallic halides and metallic oxides is selected from the group consisting of uranium, plutonium, mixtures and solid solutions of uranium and plutonium, titanium, zirconium, silicon, tungsten, gadolinium, aluminum and mixtures thereof, comprising the step of heating the composition at a temperature in the range of about 600° F to about 1600° F in a dehalogenation atmosphere comprising a vaporized alcohol.

3,997,466

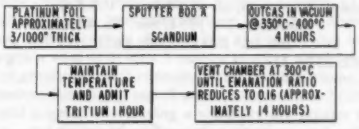
METALLIC FOIL COATED WITH SCANDIUM TRITIDE FOR USE AS A BETA PARTICLE SOURCE IN AN IONIZATION DETECTOR AT HIGH TEMPERATURES AND METHOD OF MANUFACTURE

Charles H. Hartmann, Moraga, Calif., assignor to Varian Associates, Palo Alto, Calif.

Continuation-in-part of Ser. No. 232,016, March 6, 1972, abandoned. This application Sept. 10, 1973, Ser. No. 395,498

Int. Cl.² C21D *1/76*

U.S. Cl. 252—301.1 R 27 Claims


PLATINUM FOIL APPROXIMATELY 3/1000" THICK
SPUTTER 800 Å SCANDIUM
OUTGAS IN VACUUM @ 350°C - 400°C 4 HOURS
MAINTAIN TEMPERATURE AND ADMIT TRITIUM 1 HOUR
VENT CHAMBER AT 300°C UNTIL EMANATION RATIO REDUCES TO 0.16 (APPROXIMATELY 14 HOURS)

1. A method of treating a scandium-coated foil for use as a beta-particle emitter at temperatures above 225° C, said method comprising:

a. an outgassing step, which comprises:
   1. inserting said scandium-coated foil into an evacuable and heatable chamber;
   2. evacuating said chamber; and
   3. heating said chamber while containuing to evacuate said chamber to remove therefrom undesired gases outgassed by said foil; and

b. a tritiating step, which comprises:
   1. discontinuing the evacuation of said chamber;
   2. introducing tritium into said chamber; and
   3. providing a constant chamber temperature at least until the tritium equilibrates with said foil; and

c. a calibrating step, which comprises:

1. reducing the partial pressure of tritium in said chamber; and
2. adjusting the chamber temperature to heat said foil at a treatment temperature above 250° C until the emanation ratio of said foil at said treatment temperature changes to a first predetermined value which correlates to a second predetermined value for the emanation ratio of said foil at an operating temperature which is different from said treatment temperature, said second predetermined value for the emanation ratio of said foil being an acceptable emanation ratio value.

3,997,467

FOAM FORMING COMPOSITION

Gustaf Lennart Jederström, Bjorklinge, Sweden, assignor to Pharmacia Aktiebolag, Uppsala, Sweden

Continuation of Ser. No. 307,904, Nov. 20, 1972, abandoned. This application May 21, 1974, Ser. No. 471,947

Claims priority, application Sweden, Nov. 26, 1971, 15217/71

Int. Cl.² C09K *3/30*

U.S. Cl. 252—305 **11 Claims**

1. A composition for forming foam, consisting essentially of a mixture of:
   1. at least one member selected from the group consisting of p-xylene, 1-decanol, oleic acid, cholesterol, butanol and caprylic acid,
   2. water,
   3. a liquefied propellant selected from the group consisting of fluoro and chloro substituted alkanes having 1 - 4 carbon atoms, and
   4. at least one surface active agent selected from the group consisting of 1-amino octane, sodium oleate, decaethylene glycol, sodium caprylate and lecithin,

   in such proportions as to obtain a mesomorphic phase, said mesomorphic phase representing at least about 5 percent by weight of the mixture, and

   said propellant being dissolved in the mesomorphic phase in an amount of at least 2 percent by weight of the mixture.

3,997,468

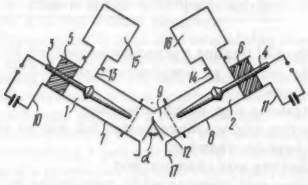
METHOD OF CREATING HIGH AND SUPERHIGH PRESSURE AND AN ARRANGEMENT FOR DISPERSING NON-METALLIFEROUS MATERIALS

Pavel Petrovich Maljushevsky, prospekt Oktyabrsky, 17a, kv. 41; Georgy Grigorievich Gorovenko, ulitsa Skorokhodova, 54, kv. 20, and Jury Alexandrovich Blagoverov, ulitsa Terrasnaya, 12, kv. 40, all of Nikolaev, U.S.S.R.

Filed Feb. 27, 1974, Ser. No. 446,511

Int. Cl.² B01J *13/00*; **B01F** *3/12*

U.S. Cl. 252—314 **6 Claims**



1. A method of creating high and superhigh pressures in a liquid medium by means of coaxial plasma systems comprising producing a high-velocity liquid stream and a shock wave by interaction of a high-voltage impulsive discharge through the liquid and a magnetic field set up by electric current flowing through center electrodes provided in said coaxial plasma systems, which coaxial plasma systems are positioned with their axes intersecting at an angle chosen so that in the zone of collision of the high-velocity streams and shock waves produced in each of said systems a maximum pressure build-up is obtained at the front of the resultant shock wave and the liquid flow is accelerated in the direction of the joined stream.

2. An arrangement for dispersing non-metalliferous materials by means of high and superhigh pressures, comprising at least two coaxial plasma accelerators each of which includes a cylindrically shaped housing with a positive center electrode mounted coaxially therein and an inlet duct for feeding pulp in the form of a non-metalliferous material and a liquid, said inlet duct being positioned on said housing upstream of said positive electrode so that the magnetic field set up by the current flowing through said electrode interacts with the radial discharge current generated by a high-voltage impulsive discharge through the pulp already contained in said housing, said coaxial plasma accelerators being positioned relative to each other so that their housings form a superpressure chamber at the intersection of the axes of said accelerators, said superpressure chamber having a central outlet duct for discharging the dispersed pulp in the direction of the joined liquid stream.

3,997,469

CORROSION INHIBITION WITH OIL SOLUBLE DIAMIDES

Charles L. Howle, Houston, Tex., assignor to Nalco Chemical Company, Oak Brook, Ill.

Filed Feb. 26, 1975, Ser. No. 553,094

Int. Cl.² C23F *11/14*

U.S. Cl. 252—392 **8 Claims**

1. A process of inhibiting corrosion of metals in contact with liquid petroleum hydrocarbons having a pH in excess of 7 which comprises adding to said hydrocarbons a corrosion inhibiting amount of a diamide or mixture of diamides which is the product of the reaction of 1,3-dipropylene triamine and one or more organic monocarboxylic acids containing a sufficient number of carbon atoms to render said diamide or mixture of diamides oil soluble and water insoluble.

7. A diamide or mixture of diamides which is the product of the reaction of 1,3-dipropylene triamine and one or more organic monocarboxylic acids containing a sufficient number of carbon atoms to render said diamide or mixture of diamides oil soluble and water insoluble, said diamide having the general formula

$$R_2 \cdot \underset{\underset{O}{\|}}{C} \cdot \underset{H}{N} \cdot CH_2 \cdot CH_2 \cdot CH_2 \cdot \underset{H}{N} \cdot CH_2 \cdot CH_2 \cdot CH_2 \cdot \underset{H}{N} \cdot \underset{\underset{O}{\|}}{C} \cdot R_1$$

wherein R_1 and R_2 are hydrocarbon radicals containing 5 to 19 carbon atoms.

3,997,470

SURFACTANT CONTAINING REAGENT FORMULATIONS FOR ASSAYING BIOLOGICAL SPECIMENS AND METHODS OF PREPARING SAME

Alexander A. Monte, and Ching Chiang, both of Glendora, Calif., assignors to Mallinckrodt, Inc., St. Louis, Mo.

Division of Ser. No. 200,552, Nov. 19, 1971, Pat. No. 3,816,262, which is a continuation-in-part of Ser. No. 190,883, Oct. 20, 1971, abandoned. This application May 9, 1974, Ser. No. 468,464

Int. Cl.² G01N *33/16*

U.S. Cl. 252—408 **31 Claims**

1. A reagent formulation for assaying a specimen for hemoglobin comprising a solid, water-soluble, substantially anhydrous, storage-stable mixture containing (a) potassium ferricyanide; (b) potassium cyanide; (c) sodium bicarbonate; (d) mannitol, and (e) a nitrogen-containing polyoxyalkylene nonionic surfactant having a structure corresponding to that ob-

tained when ethylene diamine is reacted sequentially with propylene oxide and ethylene oxide in the presence of a catalyst, the polyoxypropylene chains of said surfactant having an average molecular weight of between about 750 and about 6750.

3,997,471

CYCLOOLEFIN METATHESIS CATALYST

Eilert A. Ofstead, Cuyahoga Falls, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Division of Ser. No. 456,912, April 1, 1974, Pat. No. 3,955,179. This application Aug. 4, 1975, Ser. No. 601,698

Int. Cl.² B01J *31/02*

U.S. Cl. 252—429 B **2 Claims**

1. A metathesis catalyst composition comprises of (A) at least one transition metal salt selected from the group consisting of tungsten halides, tungsten oxyhalides, molybdenum halides and molybdenum oxyhalides, (B) at least one compound selected from the group consisting of dialkylaluminum halides, alkylaluminum sesquihalides and alkylaluminum dihalides, (C) at least one compound of the general formula ROH wherein R is selected from the group consisting of alkyl and cycloalkyl, and wherein R contains a nitrile substituent situated on the carbon atom adjacent to that bearing the hydroxy group, and (D) a compound of the general formula ROH wherein R is selected from the group consisting of alkyl, cycloalkyl, alkoxyalkyl, haloalkyl, and aryl, and wherein the molar ratio of A:B:C:D lies within the range of 1:0.5–10:0.5–3:0.5–1.

3,997,472

NOVEL CATALYST SYSTEMS AND METHODS OF PREPARATION

Kenneth F. O'Driscoll, and Garry L. Rempel, both of Waterloo, Canada, assignors to Polymeric Enzymes, Inc., Buffalo, N.Y.

Filed Nov. 11, 1974, Ser. No. 522,490

Int. Cl.² B01J *31/02*

U.S. Cl. 252—430 **16 Claims**

1. A catalyst system consisting essentially of a cross-linked pore-free amorphous polymer gel having a colloidal dispersion of catalytically-active finely-divided elemental metal particles selected from Group VIB and Group VIII metals and uniformly distributed throughout said gel, said polymer being chemically inert to said metal particles.

8. A method of forming a catalyst system which comprises forming a cross-linked pore-free amorphous polymeric gel swollen by a solution of a non-catalytically-active metal compound in a solvent, said metal compound being capable of activation to a catalytically-active form of the metal, said polymeric gel being chemically inert to and incapable of entering into covalent chemical bonding with said solvent, said non-catalytically-active metal compound and said catalytically-active form of the metal, and activating the metal compound to a catalytically-active form of the metal.

3,997,473

HYDRODESULFURIZATION CATALYSTS SUPPORTED ON CARBON

Joseph Lawrence Schmitt, Jr., Bethel, and George Augustus Castellion, Stamford, both of Conn., assignors to American Cyanamid Company, Stamford, Conn.

Continuation-in-part of Ser. No. 408,356, Oct. 23, 1973, abandoned. This application Jan. 14, 1975, Ser. No. 540,936

Int. Cl.² B01J *27/04*

U.S. Cl. 252—439 **10 Claims**

1. A process for the preparation of a hydrodeulfurization catalyst useful in treating petroleum residuum which process comprises: (1) selecting a porous carbon support which has a surface area in the range of about 200 to 800 square meters per gram, a pore volume of about 0.25 to 1.3 cubic centimeters per gram so as to have an average pore radius of at least 25 angstrom units, and a compacted bulk density of about 0.3 to 0.8 gram per cubic centimeter; (2) impregnating said support with sufficient of an aqueous solution of a compound of a first metal selected from the group consisting of tungsten and molybdenum so as to deposit at least 10 and up to 20 weight percent of said first metal thereon and with sufficient of an aqueous solution of a compound of a second metal selected from the group consisting of cobalt and nickel so as to deposit from about 2 to 10 weight percent of said second metal thereon, said metal percentages being expressed as the metal oxide contents and said metal compounds being convertible to their sulfides, said impregnating being carried out in at least one step with at least some of said first metal compound being present in a first impregnating step when more than one impregnating step is employed; (3) drying the impregnated support at a temperature below about 350° C.; and (4) sulfiding the dried composition prior to use.

6. The catalyst produced by the process of claim 1.

3,997,474

ACTIVATION OF FERRIERITE

Joseph N. Miale, Trenton, and David H. Olson, Pennington, both of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Filed June 24, 1974, Ser. No. 482,286

Int. Cl.² B01J *29/00, 29/06*

U.S. Cl. 252—450 **6 Claims**

1. A method of activating natural ferrierite for the catalytic conversion of hydrocarbons comprising a first contact of said ferrierite with the ammonium ion or aqueous HF and a second contact wherein the ammonium ion treated-ferrierite is contacted with aqueous HF and the aqueous HF-treated ferrierite is contacted with the ammonium ion.

3,997,475

SUPPORTED NICKEL CATALYST

Hendrik Theodorus Rijnten, Maasland, and Pieter Scherpenisse, Maassluis, both of Netherlands, assignors to Lever Brothers Company, New York, N.Y.

Continuation of Ser. No. 442,969, Feb. 15, 1974, abandoned. This application July 25, 1975, Ser. No. 599,205

Int. Cl.² B01J *29/10, 23/40*

U.S. Cl. 252—459 **7 Claims**

1. In a process for the preparation of a supported nickel catalyst wherein nickel in the form of nickel hydroxide, is precipitated from an aqueous solution of a nickel salt, onto a carrier material suspended in said solution after which the combined material is separated from said aqueous solution, the improvement which comprises the step of intimately contacting said carrier material with an aqueous solution of said nickel salt, an organic base selected from the group consisting of primary and secondary alkyl amines and containing in the alkyl groups a total of at least 8 carbon atoms; t-alkyl amines, the t-alkyl groups of which contain 18 to 22 carbon atoms; and alkyl diamines the alkyl group of which contain 9 to 12 carbon atoms; said organic base having a solubility not greater than that of n-octyl amine in said aqueous solution; and sodium hydroxide; thereby gradually precipitating said nickel hydroxide onto said carrier material.

5. A process as claimed in claim 1 in which the carrier material comprises silica with a specific surface of 5 to 750 m^2/g.

3,997,476

ALUMINA TREATMENT

Neville L. Cull, Baker, La., assignor to Exxon Research and Engineering Company, Linden, N.J.

Filed July 8, 1975, Ser. No. 593,952

Int. Cl.² B01J *21/04*

U.S. Cl. 252—463 **18 Claims**

1. A process for increasing the pore volume of an alumina, which comprises treating a calcined alumina having a rela-

tively low pore volume with an aqueous solution consisting of an organic acid selected from the group consisting of polycarboxylic acids, hydroxy-substituted monocarboxylic acids and amino-substituted monocarboxylic acids, for a time sufficient to increase the pore volume of said calcined alumina, drying the acid treated alumina, and calcining the dried alumina.

3,997,477

CATALYST FOR REFORMING HYDROCARBON FUEL

Yukihisa Takeuchi, Aichi, Japan, assignor to Nippon Soken, Inc., Japan

Filed Nov. 28, 1975, Ser. No. 636,293
Claims priority, application Japan, Dec. 11, 1974, 44-142806; Aug. 29, 1975, 50-105249
Int. Cl.² B01J 21/04, 23/26, 23/72, 23/74
U.S. Cl. 252—465 9 Claims

1. A catalyst for reforming a hydrocarbon fuel to a hydrogen-rich gas, which comprises a γ-alumina carrier, a layer of at least one of iron trioxide and chromium trioxide coated on substantially all of surface of the γ-alumina carrier, and at least one metal of nickel and copper supported on said layer.

3,997,478

PROMTED RANEY-NICKEL CATALYSTS

Jozsef Petro, Budapest, Hungary, assignor to Budapesti Muszki Egyetem, Budapest, Hungary

Filed Sept. 22, 1975, Ser. No. 615,241
Claims priority, application Hungary, Oct. 7, 1974, BU 737
Int. Cl.² B01J 23/84, 23/86, 23/88
U.S. Cl. 252—470 2 Claims

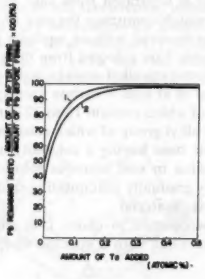
1. A Raney-nickel catalyst containing as promoter at least two metals selected from the group consisting of chromium, cobalt, molybdenum and manganese.

3,997,479

METHOD OF REDUCING THE EVAPORATION OF PB DURING THE MANUFACTURE OF BARIUM TITANATE (PB SUBSTITUTED) SEMICONDUCTING CERAMICS

Nobuei Shimojo, Ichikawa, and Ichihito Minesaki, Yokohama, both of Japan, assignors to TDK Electronics Company, Limited, Tokyo, Japan

Filed July 30, 1974, Ser. No. 493,155
Claims priority, application Japan, July 30, 1973, 48-84974
Int. Cl.² H01B 1/08
U.S. Cl. 252—520 8 Claims



1. A method of making semiconducting ceramics having a selected positive temperature coefficient of resistivity comprising the steps of:

providing a composite material consisting of a composition, having the formula $(Ba_{1-x-y}Pb_xR_y)TiO_3$ (where $0 < x$ 0.8, y is the remainder and R represents a rare earth element, and an additive material containing at least one of the elements Nb and Ta in an amount within the range of approximately 0.05 to 0.5 atomic %, wherein the total amount of R and said at least one of said elements of said additive material is within the range of approximately 0.1 to 0.55 atomic %;

forming said composite material into a shaped element; and

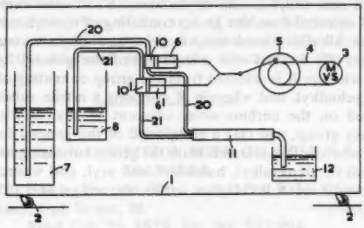
firing said shaped element at 1250° to 1400° C for 0.5 to 1 hour in air to produce said ceramic.

3,997,480

AIR TREATING GEL

Alan Singleton, Glen Waverley, and Paul Kemp Montagnat, Langwarrin, both of Australia, assignors to The Kiwi Polish Company Pty. Ltd., Australia

Filed Nov. 25, 1974, Ser. No. 527,168
Int. Cl.² A61K 7/46; C11B 9/00
U.S. Cl. 252—522 7 Claims



1. An air treating gel consisting essentially of an aqueous medium, at least one volatile air treating component and a gelling agent, wherein the gelling agent consists of the reaction product of a water soluble alkali metal salt of carboxymethyl cellulose and a trivalent metal salt having low solubility in water.

3,997,481

DETERGENTS CONTAINING 1,2-DIAMINO-CYCLOHEXANE-N,N,N′,N′-TETRAACETIC ACIDS

Bao-Ding Cheng, Highland Park, N.J., assignor to Colgate-Palmolive Company, New York, N.Y.

Filed Sept. 25, 1972, Ser. No. 291,682
Int. Cl.² C11D 1/83, 3/33, 9/30, 17/08
U.S. Cl. 252—547 1 Claim

1. A liquid cleaning composition substantially free of phosphate and nitrilotriacetic acid builders consisting essentially of, by weight, 31.0% mixed C_{12-15} alcohol triethenoxy sulfate, sodium salt, 10.3% C_{14-15} alkyl polyethenoxy non-ionic containing 11 moles of ethylene oxide, 22.0% 1,2-diaminocyclohexane tetraacetic acid, 10.3% linear tridecyl benzene sulfonate, sodium salt, 8.6% isopropyl alcohol and the balance essentially water.

3,997,482

HYDROPHILIC POLYMERIC CARRIERS OF BIOLOGICALLY ACTIVE COMPOUNDS AND METHOD OF PREPARING THE SAME

Jaroslava Turková, Cesky Brod, and Jiří Coupek, Prague, both of Czechoslovakia, assignors to Ceskoslovenska akademie ved, Prague, Czechoslovakia

Filed July 8, 1974, Ser. No. 486,350
Int. Cl.² C08F 8/18
U.S. Cl. 260—2.5 R 17 Claims

1. A dry hydrophilic polymeric carrier for biologically active compounds comprising the reaction product of 5 to 50% by weight of BrCN and a macroporous gel copolymer of (1) a hydroxy alkyl ester of acrylic or methacrylic acid and (2) about 10 to 90% by weight of a member selected from the group consisting of (a) a cross-linking acrylate or methacryl-

ate derived from the corresponding acid and a bi - or trifunctional alcohol and (b) bismethacrylamide, bisacrylamide and divinylbenzene, said hydroxy alkylester (1) further containing a sufficient amount of free hydroxyl groups operative to react with said BrCN.

3,997,483

POLYAMIDEPOLYAMINE AND POLYANIONIC POLYMER PRETREATED NON-CELLULOSIC CARRIER ADSORPTION AGENTS

Rudolf Wurster, Pfeffingen, and Jaroslav Haase, Basel, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Oct. 31, 1974, Ser. No. 519,881

Claims priority, application Switzerland, Nov. 8, 1973, 15718/73

Int. Cl.² C08L *1/28, 91/00*

U.S. Cl. 260—15 **9 Claims**

1. An adsorption agent for removing a contaminant from an industrial waste water effluent, which comprises a non-cellulosic carrier pretreated with a basic nitrogeneous polymer and a polyanionic polymer, wherein said basic nitrogeneous polymer is a polyamidepolyamine of a polymeric fatty acid and a polyamine.

3,997,484

HIGHLY-ABSORBENT STARCH-CONTAINING POLYMERIC COMPOSITIONS

Mary Ollidene Weaver, Peoria; Edward B. Bagley, Morton; George F. Fanta, Peoria, and William M. Doane, Morton, all of Ill., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Division of Ser. No. 456,911, April 3, 1974, Pat. No. 3,935,099. This application Sept. 8, 1975, Ser. No. 611,461

Int. Cl.² C08L *3/00*

U.S. Cl. 260—17.4 GC **15 Claims**

1. Aqueous fluid-absorbing compositions comprising water-insoluble alkali salts of aqueous alkali saponified gelatinized-starch-polyacrylonitrile graft polymers containing gelatinized starch (GS) and saponified polyacrylonitrile (HPAN) in molar ratios of from about 1:1.5 to 1:9 GS:HPAN, said water-insoluble alkali salts of aqueous alkali saponified gelatinized-starch-polyacrylonitrile graft polymers being further characterized as water-insoluble solids capable of absorbing in excess of 300 parts of water by weight per part of said water-insoluble solids.

3,997,485

AMBIENT TEMPERATURE, MOISTURE CURABLE COATING COMPOSITIONS WHICH FORM FILMS HAVING EXCELLENT GLOSS

Rostyslaw Dowbenko, Gibsonia, and Marvis E. Hartman, Pittsburgh, both of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Filed Feb. 11, 1975, Ser. No. 549,122

Int. Cl.² C08G *63/48;* **C08L** *67/08, 83/10*

U.S. Cl. 260—22 S **19 Claims**

1. In an ambient temperature moisture-curable coating composition which includes:

A. an interpolymer of monomers consisting essentially of:

1. from about 75 percent to about 95 percent by weight of interpolymer of at least one ethyleneically-unsaturated monomer which contains a $CH_2{=}C <$ group and is devoid of active hydrogen atoms;

2. from about 5 percent to about 25 percent by weight of interpolymer of a copolymerizable organoalkoxysilane selected from the group consisting of acrylatoalkoxysilanes, methacrylatoalkoxysilanes, and vinylalkoxysilanes; and

B. from about 0.5 to about 3 percent by weight of interpolymer solids of a cure-accelerating catalyst; the improvement which comprises the addition thereto of

C. from about 5 percent to about 40 percent by weight of non-volatile polymer solids of a graft copolymer consisting of an oil-modified alkyd resin backbone and a polymeric side chain of polymerized organoalkoxysilane and acrylic monomer units wherein said alkyd resin backbone prior to graft copolymerization contains up to about 25 percent of an alpha, beta-ethylenically unsaturated compound and is very low in functionality, and wherein said graft copolymer contains from about 5 percent to about 30 percent by weight of the organoalkoxysilane compounds.

3,997,486

PREPARATION OF POLYMERIC CHROMIUM COMPLEXES

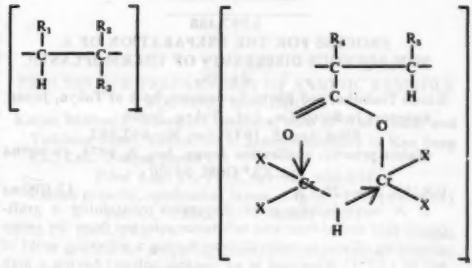
Earl Phillip Moore, Jr., Hockessin, Del., and Fred Lee Bunger, North Ridgeville, Ohio, assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 421,595, Dec. 4, 1973, abandoned. This application Jan. 29, 1975, Ser. No. 545,143

Int. Cl.² C08L *91/00, 33/02*

U.S. Cl. 260—23 CP **14 Claims**

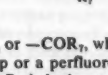
1. A method for preparing an organic polymeric composition consisting essentially of monomeric units polymerized together, said polymeric composition being represented by the structural formula:



where

R_1 is hydrogen or an aliphatic hydrocarbon group of 1 to 6 carbon atoms or an aromatic hydrocarbon group of 6 to 12 carbon atoms;

R_2 is hydrogen, halogen, —CN, $-CO_2R_6$,



$-OCOR_7$, $-OR_7$, or $-COR_7$, where R_6 is hydrogen or a hydrocarbon group or a perfluoroalkyl group of 1 to 20 carbon atoms and R_7 is hydrogen or an aliphatic hydrocarbon group of 1 to 4 carbon atoms;

R_3 is hydrogen or methyl;

R_4 is hydrogen or a hydrocarbon group of 1 to 4 carbon atoms;

R_5 is hydrogen or a hydrocarbon group of 1 to 18 carbon atoms;

the sum of the carbon atoms of R_4 and R_5 is no more than 20;

the unit n can contain 0, 1 or 2 double bonds;

X is Br^-, Cl^-, No_3^- or OH^-;

m and n are mole fractions, the total of which equals one, with n being at least 0.01;

and said polymeric composition containing about, by weight, 1 to 35 percent chromium,

wherein a carboxylic acid-chromium complex is copolymerized through unsaturated bonds with an organic monomer, using a free-radical initiator to commence such

polymerization, said complex, monomer and polymeric composition being dissolved in a water-miscible solvent.

3,997,487

THERMOPLASTIC ELASTOMER

Richard Watkin Rees, and Hans-Georg Reinhardt, both of Wilmington, Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 405,805, Oct. 12, 1973, abandoned. This application Aug. 20, 1974, Ser. No. 498,978

Int. Cl.² C08K *5/01*; C08L *93/00*

U.S. Cl. 260—27 BB **12 Claims**

1. A thermoplastic elastomer which is the product of reacting, at an elevated temperature of about 80°–190° C.,

A. an alpha-olefin copolymer elastomer having carboxylic acid groups and containing interpolymerized units of ethylene, at least one C_3–C_{20} alpha-mono-oelfin and at least one nonconjugated diene, said copolymer containing about 0.5–5.0 percent by weight of a carboxyl-group-containing monomer which has been grafted onto the copolymer or copolymerized with the other monomers of the copolymer, and

B. a rosin salt of a divalent or monovalent metal; the amount of component (B) reacted with component (A) being about 10-50 percent based on the total weight of components (A) and (B).

3,997,488

PROCESS FOR THE PREPARATION OF A NON-AQUEOUS DISPERSION OF THERMOPLASTIC RESIN

Kazuo Tsubuko, and Eiichi Kawamura, both of Tokyo, Japan, assignors to Ricoh Co., Ltd., Tokyo, Japan

Filed Aug. 5, 1975, Ser. No. 602,103

Claims priority, application Japan, Aug. 8, 1974, 49-90984

Int. Cl.² C08L *91/00*

U.S. Cl. 260—28.5 A **12 Claims**

1. A non-aqueous resin dispersion containing a graft-copolymer and at least one substance selected from the group consisting of wax or polyethylene having a softening point of 60° to 130° C, dispersed in an organic solvent having a high resistivity and a low dielectric constant, said non-aqueous resin dispersion having been prepared by carrying out successively the following four steps (a), (b), (c) and (d) in said organic solvent, at an elevated temperature, adding said wax or polyethylene in one of the four steps and dissolving it in the solvent, and cooling the reaction product of step (d) while stirring vigorously:

a. copolymerizing from 99.9 to 80 parts by weight of a monomer having the formula (I)

wherein

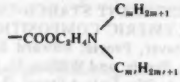
R is hydrogen or methyl, A is $-COOC_nH_{2n+1}$ or $-OC_nH_{2n+1}$, and n is an integer of from 6 to 20, with from 0.1 to 20 parts by weight of at least one co-monomer selected from the group consisting of an unsaturated carboxylic acid, glycidyl acrylate and glycidyl methacrylate;

b. esterifying 100 parts by weight of the copolymer obtained in step (a) with from 0.1 to 20 parts by weight of glycidyl acrylate or glycidyl acrylate when said copolymer has been prepared by using an unsaturated carboxylic acid, or esterifying 100 parts by weight of the copolymer obtained in step (a) with from 0.1 to 20 parts by weight of said unsaturated carboxylic acid when said copolymer has been prepared by using glycidyl acrylate or glycidyl methacrylate;

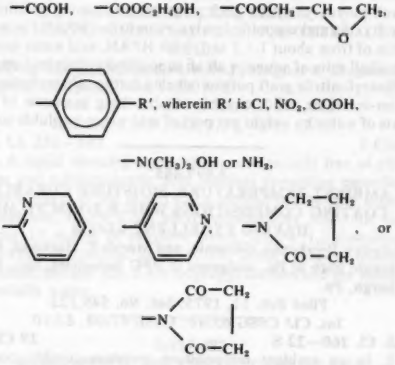
c. grafting 100 parts by weight of the esterified copolymer obtained in step (b) with from 5 to 100 parts by weight of a monomer having a vinyl group;

d. polymerizing 100 parts by weight of the graft copolymer obtained in step (c) with from 0.1 to 20 parts by weight of a compound selected from the group consisting of maleic acid, furmaric acid, allylamine, vinylamine, aroyl alcohol, vinylsulfonic acid, vinyl phosphate and a vinyl monomer having the formula

wherein R is hydrogen or methyl, and B is



wherein m and m' are integers from 1 to 4,



and wherein the amount of said wax or polyethylene added is as follows:

when added in step (a), from 5 to 50 parts by weight of said wax or polyethylene, per 100 parts by weight of the sum of the weights of said monomer (I) and said co-monomer,

when added in step (b), from 5 to 50 parts by weight of said wax or polyethylene, per 100 parts by weight of the copolymer obtained in step (a),

when added in step (c), from 1 to 40 parts by weight of said wax or polyethylene, per 100 parts by weight of the esterified copolymer obtained in step (b), and

when added in step (d), from 5 to 50 parts by weight of said wax or polyethylene, per 100 parts by weight of the graft copolymer obtained in step (c).

3,997,489
MELT EXTRUDABLE POLYVINYL ALCOHOL COMPOSITIONS

James Newton Coker, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Nov. 25, 1974, Ser. No. 527,063
Int. Cl.² C08L 91/00
U.S. Cl. 260—28.5 R 10 Claims

1. A melt extrudable composition consisting essentially of (a) polyvinyl alcohol having a degree of polymerization from about 500 to about 2000 and a degree of hydrolysis of at least about 88%; (b) 0 to about 20% of plasticizer, based upon the weight of polyvinyl alcoholplasticizer blend, selected from the group consisting of polyhydric alcohols of the formula $R(OH)_x$ where R is an alkyl group of C_2–C_4 and x is 2–4 and ether condensation products thereof having a molecular weight of up to about 1000; aliphatic amides of the formula $R'(CONR^2R^3)_x$ where R'=H or C_1–C_6 alkyl, R^2=H or C_1–C_3 alkyl, R^3=H or C_1–C_3 alkyl and x=1–2, ureas of the formula $R^4R^6NCONR^5R^7$, where R^4 and R^6=C_1–C_3 alkyl and R^5 and R^7=H or C_1–C_3 alkyl, and hydroxylated aliphatic amines of the formula $(R^8)_3N$, where R^8 is a mono- or dihydroxy alkyl group containing 2–4 carbon atoms and where the number of hydroxyl group is less than the number of carbon atoms; (c) about 0.5% to 5.0%, based upon the weight of polyvinyl alcohol-plasticizer blend, of a wax having a weight average molecular weight of from about 100 to about 4000, said wax being selected from the group consisting of fatty acids, fatty acid salts, fatty amides, fatty esters, fatty ethers, fatty alcohols and saturated and unsaturated hydrocarbons, provided that for blends of sodium acetate free polyvinyl alcohol neutral waxes are selected; (d) about 0.5% to 5.0%, based upon the weight of polyvinyl alcohol-plasticizer blend, of an ethylene polymer selected from the group consisting of homopolymers of ethylene and copolymers of ethylene with an ethylenically unsaturated monomer, said ethylene polymer having a weight average molecular weight of from about 4000 to about 50,000; provided that in any given blend the molecular weight of component (d) is at least three times higher than the molecular weight of component (c).

3,997,490
AQUEOUS DISPERSIONS OF AMPHOTERIC POLYURETHANE-UREA AND METHOD OF MAKING

Kazuo Matsuda; Hidemasa Ohmura, and Hirakazu Aritaki, all of Wakayama, Japan, assignors to Kao Soap Co., Ltd., Tokyo, Japan

Filed Feb. 3, 1975, Ser. No. 546,731
Claims priority, application Japan, Feb. 15, 1974, 49-18221
Int. Cl.² C08J 3/06; C08L 75/12
U.S. Cl. 260—29.2 TN 5 Claims

1. A process for preparing an amphoteric thermosetting polyurethane emulsion, which consists essentially of:

1. reacting, in the liquid phase and in a ketone solvent, at a temperature of from −20° to +70° C., (A) isocyanate-terminated urethane prepolymer prepared by reacting organic polyol having a molecular weight in the range of from 200 to 10,000 with an excess of organic polyisocyanate, with (B) an excess of polyalkylene polyamine having at least two primary or secondary amino groups, the total mole number of primary and secondary amino groups in the polyalkylene polyamine being greater than the total mole number of isocyanate groups in the isocyanate-terminated urethane prepolymer, the reaction being carried out until the presence of —NCO groups cannot be detected, whereby to form polyurethane-urea-polyamine,
2. reacting, in the liquid phase, the reaction product of step 1 with an epihalohydrin, at a temperature of +20° to +70° C., for 0.5 to 5 hours, the amount of said epihalohydrin being in the range of from 0.2 to 1.0 moles per mole of the primary and secondary amino groups of said polyurethane-urea-polyamine,
3. reacting, in the liquid phase, the reacting product of step 2 with either
   a. a substance selected from the group consisting of 1,3-propane sultone, 1,4-butane sultone, β-propiolactone, ε-caprolactone, δ-valerolactone and sodium monohalogenated carboxylate, at a temperature of +40° to +70° C., for 3 to 7 hours, the amount of said substance being in the range of 0.5 to 2.0 moles per mole of amino groups of the polyurethane-urea-polyamine and sufficient to render amphoteric the amino groups of the reaction product of step 2 so that a stable emulsion is formed when water is added and blended in the product of step 3(a), or
   b. a substance selected from the group consisting of methyl acrylate, ethyl acrylate, methyl methacrylate, ethyl methacrylate, and acrylonitrile, at a temperature of 40° to 70° C., for 3 to 7 hours and then hydrolyzing the reaction product, the amount of said substance (b) being in the range of 0.5 to 2.0 moles per mole of amino groups of the polyurethane-urea-polyamine and being sufficient to render amphoteric the amino group of the reaction product of step 2 so that a stable emulsion can be formed when water is added and blended in the product of step 3(b),
4. treating the product of step 3 to remove the organic solvent therefrom and adding water thereto and thereby obtaining an aqueous thermosetting polyurethane emulsion as a final product.

3,997,491
PROCESS FOR PREPARATION OF ANIONIC RESINOUS AQUEOUS EMULSIONS

Kazuo Matsuda; Hidemasa Ohmura, both of Wakayama, and Yukihisa Niimi, Osaka, all of Japan, assignors to Kao Soap Co., Ltd., Tokyo, Japan

Filed Aug. 15, 1975, Ser. No. 604,934
Claims priority, application Japan, Aug. 23, 1974, 49-96781
Int. Cl.² C08G 18/71; D06M 15/52
U.S. Cl. 260—29.2 TN 11 Claims

1. A process for preparing an anionic polyurethane aqueous emulsion, which comprises:

1. reacting, in the liquid phase and in a ketone solvent, at a temperature of from −20° to +70° C, (A) isocyanate-terminated urethane prepolymer prepared by reacting organic polyol having a molecular weight in the range of from 200 to 10000 with an excess of organic polyisocyanate, with (B) an excess of polyalkylene polyamine having at least two primary or secondary amino groups, the total mole number of primary and secondary amino groups in the polyalkylene polyamine being greater than the total mole number of isocyanate groups in the isocyanate-terminated urethane prepolymer, the reaction being carried out until the presence of —NCO groups cannot be detected, whereby to form polyurethane-urea-polyamine,
2. reacting with the polyurethane-urea-polyamine of step 1, a substance selected from the group consisting of alkyl isocyanates having an alkyl group containing 12 to 22 carbon atoms, and α-olefin epoxides having from 12 to 22 carbon atoms, to form an alkyl-substituted polyurethane-urea-polyamine, the amount of said substance being from 10 to 80 mole %, based on the number of moles of amino groups in the molecule of said polyurethane-urea-polyamine,
3. reacting the reaction product of step 2 with a cyclic dicarboxylic acid anhydride in an amount equimolar to the number of moles of unreacted amino groups of said alkyl-substituted polyurethane-urea-polyamine, at 10° to 60° C, for 0.5 to 3 hours,
4. adding to the reaction product of step 3 an aqueous solution of a base to form a neutralized emulsion,
5. treating the product of step four to remove the organic solvent therefrom and thereby obtaining an aqueous anionic polyurethane emulsion as a final product.

3,997,492

HIGH HLB LATEX POLYMERS

James Kane, Park Forest, Ill., and R. James Shields, III, Munster, Ind., assignors to Nalco Chemical Company, Oak Brook, Ill.

Filed Jan. 22, 1975, Ser. No. 542,982
Int. Cl.² C08L 33/26
U.S. Cl. 260—29.6 WQ 18 Claims

1. A process of the type wherein a water-in-oil emulsion polymerization method for making polymers and copolymers of water-soluble ethylenic unsaturated monomers is used which method comprises forming a water-in-oil emulsion of the group consisting of a water-soluble ethylenic unsaturated monomer having a water solubility of at least 5 weight percent and aqueous solutions thereof, in an inert hydrophobic liquid organic dispersion medium containing between 0.25 and 10% percent by weight of a water-in-oil emulsifying agent, wherein the proportion of aqueous phase ranges between 70 and 95 percent of the emulsion, heating the emulsion under free radical forming conditions to polymerize monomer in a disperse phase in said dispersion medium and recovering the polymerized latex product; the improvement which comprises using as the inert hydrophobic liquid organic dispersion medium an aliphatic hydrocarbon liquid and one or more water-in-oil emulsifying agents whereby an emulsion is formed having a cohesive energy ratio within the range of 1.0 to 3.0.

3,997,493

HIGH FLASH POINT OIL-EXTENDED RUBBER

Albert W. Morgan, Collinsville, Ill., and Roland G. Ribaudo, St. Louis, Mo., assignors to Monsanto Company, St. Louis, Mo.

Continuation-in-part of Ser. No. 495,617, Aug. 8, 1974, abandoned, which is a continuation of Ser. No. 203,859, Dec. 1, 1971, abandoned. This application Sept. 22, 1975, Ser. No. 615,619
Int. Cl.² C08K 5/01; C08L 7/00; C08K 17/00
U.S. Cl. 260—29.7 GP 22 Claims

1. A composition comprising (A) a rubber, (B) at least about 37.5 phr of an extender oil for said rubber, (C) a flame retardant and (D) from about 0.05 to about 5.0 phr of a high viscosity liquid viscosity index modifier for said extender oil, said modifier having an aliphatic non-polar backbone containing pendant carboxyl groups wherein the composition does not burn over a maximum of 90 seconds in the SBR Vertical Burn Test.

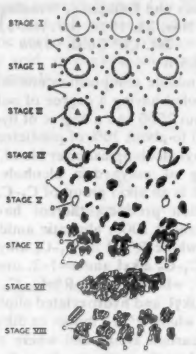
3,997,494

COMPOUNDED THERMOPLASTIC POLYMERIC MATERIALS AND FILLERS

Ray Clarence Lever, Fairfield, and Edward Vincent Wilkus, Trumbull, both of Conn., assignors to General Electric Company, New York, N.Y.

Filed July 19, 1972, Ser. No. 273,156
Int. Cl.² C08K 9/10, 9/12
U.S. Cl. 260—42.42 14 Claims

1. A thermoplastic polymeric material and particulate filler molding compound comprising particulate cohesive bodies of the compounded ingredients comprising polymeric material and filler proportioned in amounts ranging from at least 5 to about 200 parts by weight of the filler per 100 parts. by weight of the polymeric material combined in a polyphase physical system of discontinuous phases interspersed with one another substantially comprising discrete blended phases of polymeric material and filler including stratified arrangements of a layer of filler particles adhered to a film-like layer of polymeric material, and interstitial phases of substantially polymeric material, said polymeric material and filler being combined to the extent that the blended phases contain a majority of greater than 50% of the filler having been assimilated with a majority of greater than 50% of the polymeric material while in a molten state, and said blended phases comprising fundamental units predominantly structured essentially of a stratified layer of the filler adhesively embraced by a film-like mass of polymeric material.



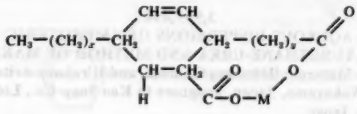
3,997,495

ORGANOMETALLIC STABILIZERS FOR VINYL CHLORIDE POLYMERS

Peter S. Creticos, Sullivan's Island, S.C., assignor to Westvaco Corporation, New York, N.Y.

Filed Jan. 14, 1976, Ser. No. 649,059
Int. Cl.² C08K 5/09; C07C 61/22
U.S. Cl. 260—45.75 W 12 Claims

1. Organometallic compounds having the structural formula

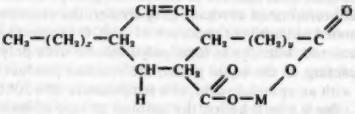


wherein x and y are integers from 3 to 9, x and y together equal 12 and wherein M is a divalent metal cation selected from the group consisting of calcium, barium, zinc and cadmium.

6. A halogen-containing polymer composition comprising;

a. a polymer selected from the group consisting of polyvinyl chloride, polyvinylidene chloride and copolymers of vinyl chloride or vinylidene chloride with at least one ethylenically unsaturated monomer, and

b. an effective amount of an organometallic compound to stabilize said polymer against deterioration from heat, said organometallic compound having the structural formula



wherein x and y are integers from 3 to 9, x and y together equal 12 and wherein M is a divalent metal cation selected from the group consisting of calcium, barium, zinc, cadmium, and mixtures thereof.

3,997,496

PROCESS FOR THE PREPARATION OF FLUOROSILICONE POLYMERS AND COPOLYMERS

John S. Razzano, Watervliet, N.Y., assignor to General Electric Company, Waterford, N.Y.

Filed May 12, 1975, Ser. No. 576,702
Int. Cl.² C08G 77/04
U.S. Cl. 260—46.5 R 13 Claims

1. A process for producing a diorganpolysiloxane having a viscosity of from 2,000 to 200,000,000 centipoise at 25° C. comprising (A) reacting a composition comprising

(i) a silanol end-stopped diorganopolysiloxane of the formula,

$$HO—R\ R^1\ SiO_x\ H$$

wherein R is methyl, ethyl, vinyl or phenyl and R^1 is $CH_2CH_2R^7$ wherein R^7 is a perfluoroalkyl group of from 1 to 6 carbon atoms and x is from 3 to 5, and

(ii) a silanol end-stopped polysiloxane of the formula,

$$HO—R_2\ SiO_y\ H$$

wherein R is, independently, as above and y is from 3 to 5, (i) being present in an amount of from 20 to 100 mol % of the composition, in the presence of a non-bond-rearranging catalyst and removing the formed water of condensation, and (B) recovering the desired product.

3,997,497

ROOM TEMPERATURE-CURABLE ORGANOPOLYSILOXANE COMPOSITIONS

Kunio Itoh, Annaka, and Tamio Sato, Takasaki, both of Japan, assignors to Shin-Etsu Chemical Co., Ltd., Tokyo, Japan

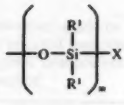
Filed Aug. 22, 1975, Ser. No. 606,977
Claims priority, application Japan, Aug. 30, 1974, 49-99766
Int. Cl.² C08G 77/04
U.S. Cl. 260—46.5 G 19 Claims

1. A room-temperature curable organopolysiloxane composition comprising

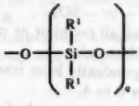
a. an organopolysiloxane represented by the general formula

$$R_a^1(R_a^1A_{3-a}SiO)_bSiA_{4-a-b}$$

where R^1 is a substituted or unsubstituted monovalent hydrocarbon group, A is a diorganosiloxy group represented by the general formula

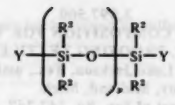


X being a hydrogen atom, a hydroxy group, a vinyl group or a hydrolyzable group and m being a positive integer larger than 5, Q is a divalent group selected from the class consisting of an oxygen atom, an imino group, a divalent organic group and a diorganopolysiloxane group represented by the general formula

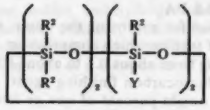


q being a positive integer, and a and b are each 0 or 1, and

b. an organosilane or an organopolysiloxane selected from the class consisting of organosilanes or linear diorganopolysiloxanes represented by the general formula



and cyclic organopolysiloxanes represented by the general formula



where p is 0 or a positive integer smaller than 11, R^2 is a monovalent hydrocarbon group and Y is a vinyl group, a hydroxy or hydrolyzable group, a hydrogen atom or a hydroxy group, respectively when X is a hydrogen atom, a hydroxy group, a vinyl group or a hydrolyzable group.

3,997,498

NON-SMUDGE CORRECTION FLUID

William P. Reese, Canandaigua, and Ira L. Seldin, Rochester, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed July 24, 1975, Ser. No. 598,501
Int. Cl.² C08K 5/02; C09D 11/10
U.S. Cl. 260—33.8 UA 8 Claims

1. A correction fluid composition for selective application to a paper sheet having markings thereon, comprising:

a. a liquid, highly halogenated ethane containing at least one fluorine atom bonded directly to a carbon atom as solvent in an amount sufficient to allow free flow characteristics of the fluid and cause it to form a thin film upon application, said halogenated ethane being characterized by the formula $CCl_3—CCl_2F$, $CCl_2F—CCl_2F$, $CCl_3—CClF_2$, $CCl_2—CF_3$, $CCl_2F—CClF_2$, $CH_2Cl—CClF_2$, $CH_2Br—CH_2F$ or $CClF_2—CCl_3$,

b. an opacifying pigment in an amount of from about 15 to 35 weight percent of the solid phase of the fluid; and

c. an air drying, film forming resin binder for the pigment which is soluble in said halogenated ethane.

3,997,499

RESIN-FORMING HOMOGENEOUS SOLUTIONS OF STYRENE, MALEIC ANHYDRIDE AND COPOLYMERS THEREOF

William J. Heilman, Allison Park, Pa.; Frank C. Peterson, Orange, Tex.; Mical C. Renz, Houston, Tex., and Leslie P. Theard, Houston, Tex., assignors to Gulf Oil Corporation, Pittsburgh, Pa.

Continuation-in-part of Ser. No. 501,634, Aug. 29, 1974, abandoned. This application June 26, 1975, Ser. No. 590,430
Int. Cl.² C08K 5/01; C08L 35/06, 63/02, 63/04
U.S. Cl. 260—33.6 UA 10 Claims

1. A homogeneous solution of styrene, maleic anhydride and a styrene-maleic anhydride copolymer comprising a mol ratio of styrene to maleic anhydride of about 1:1 to about 4.5:1, a mol ratio of styrene to maleic anhydride in the said styrene-maleic anhydride copolymer of about 1:1 to about 2:1 and an anhydride equivalent ratio of maleic anhydride to styrene-maleic anhydride copolymer of about 1:2 to about 10:1.

3,997,500

PROCESS AND COMPOSITION FOR WATER- AND OIL-PROOFING TEXTILES

Walter L. Vaughn, Lake Jackson, Tex., assignor to The Dow Chemical Company, Midland, Mich.

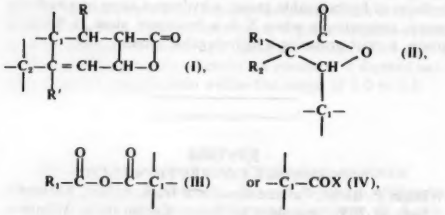
Continuation-in-part of Ser. No. 242,747, April 10, 1972, abandoned, which is a continuation-in-part of Ser. No. 10,008, Feb. 9, 1970, abandoned. This application Aug. 15, 1974, Ser. No. 497,780

Disclosure was also published under second Trial Voluntary Protest Program on Feb. 24, 1976

Int. Cl.² C08K *5/02*

U.S. Cl. 260—33.8 UA 6 Claims

1. A composition for improving the water- and/or oil-repellent properties of textiles which comprises an inert anhydrous solvent containing from about 0.1 to about 10 weight percent of a polymeric fluorocarbon finishing agent, and from about 0.3 to about 10 weight percent of one or more polyalkylene copolymer extenders of the formulae



(I), (II), (III) or —C_1—COX (IV),

wherein C_1 and C_2 are, independently, carbon atoms of the polyalkylene chain represented by $+CH_2-CH_2+_n$; R and R′ are, independently, hydrogen, an alkyl group of up to about 20 carbon atoms, phenyl, —COOH, or a segment of the polyalkylene chain; R_1 and R_2 are, independently, alkyl, aryl, aralkyl or alkaryl groups of up to about 20 carbon atoms, and X is a halogen, said polymeric extender having a molecular weight of from about 800 to about 8000.

3,997,501

POLYOL-SILICATE ESTER-EXCHANGE REACTION PRODUCT

Gordon D. McLeod, Adrian, Mich., assignor to Mobil Oil Corporation, New York, N.Y.

Division of Ser. No. 409,067, Oct. 24, 1973, Pat. No. 3,932,339, which is a continuation-in-part of Ser. No. 283,964, Aug. 28, 1972, Pat. No. 3,917,648, which is a continuation-in-part of Ser. No. 107,578, Jan. 18, 1971, abandoned, which is a continuation-in-part of Ser. No. 75,309, Sept. 24, 1970, abandoned. This application June 11, 1975, Ser. No. 585,865

Int. Cl.² C08L *83/00*

U.S. Cl. 260—37 SB 8 Claims

1. An essentially anhydrous polyol silicate composition consisting essentially of solvent-soluble, polyol silicate ester-exchange reaction product of (1) silicate consisting essentially of a member selected from the group consisting of ortho silicates having ester-exchangeable groups of 1 to 6 carbon atoms selected from the group consisting of alkyl, hydroxyalkyl, alkoxyalkyl and hydroxyalkoxyalkyl, siloxanes thereof and their mixtures, and (2) aliphatic polyol which is ester-exchangeable with (1) said reaction product being made by reacting (1) and (2) in amounts providing a ratio of hydroxyl groups of (2) of about 0.15 to 1.8 moles per mole of ester-exchangeable group of (1); and a minor amount of solvent-soluble polyvinyl alkylal polymer to improve the flexibility of a coating made from said composition.

3,997,502

MORTAR OF INORGANIC BINDER AND FORMALDEHYDE CONDENSATION PRODUCT OF SULFONATED AROMATIC ETHER, IMINE OR SULFONE

Kurt Schaupp, Cologne, Germany, assignor to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed May 1, 1974, Ser. No. 465,955

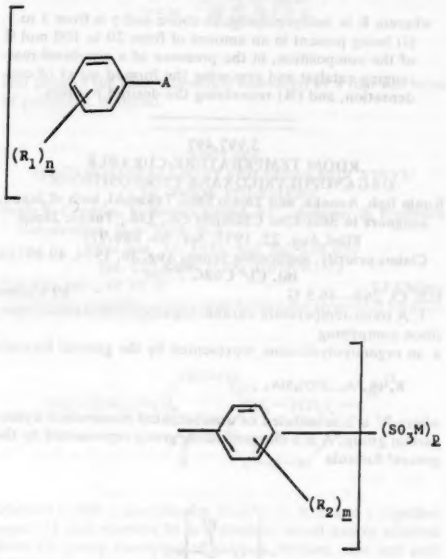
Claims priority, application Germany, May 5, 1973, 2322707

Disclosure was also published under second Trial Voluntary Protest Program on Feb. 3, 1976

Int. Cl.² C08L *61/00*

U.S. Cl. 260—37 R 7 Claims

1. A mortar comprising an inorganic binder and about 0.05 to 10% of its weight of a condensation product of formaldehyde with a compound of the formula



wherein

R_1 and R_2 each independently is hydrogen, an alkyl radical with 1 to 6 carbon atoms or —NR′R″;

R′ and R″ each independently is hydrogen or an alkyl radical with 1 to 6 carbon atoms;

A is —O—, —NR′— or —SO_2—;

M is hydrogen, an alkali metal or an equivalent of an alkaline earth or earth metal;

m and *n* each independently is an integer from 1 to 5; and

p is an integer from 0 to 4;

the compound having at least one hydrogen atom capable of condensation with formaldehyde which can either be attached to a carbon atom of an aromatic ring or, where an NR′R″— substituent is present in the molecule, to nitrogen.

3,997,503
POLYMER COMPOSITION

Terence John Henman, Haslingfield, and Graham Williams, Hitchin, both of England, assignors to Imperial Chemical Industries Limited, London, England

Filed Nov. 12, 1973, Ser. No. 415,122

Claims priority, application United Kingdom, Nov. 27, 1972, 54674/72

Disclosure was also published under second Trial Voluntary Protest Program on Feb. 10, 1976

Int. Cl.² C08K *3/30, 7/14*

U.S. Cl. 260—42.15 **11 Claims**

1. A polymeric composition comprising a blend of (a) a graft copolymer obtained by grafting an unsaturated dicarboxylic acid or the anhydride thereof onto a propylene polymer wherein the grafted acid or anhydride is present in an amount sufficient to give an acid moiety which is at least equivalent to that provided by 0.01 percent by weight of maleic anhydride, and (b) at least one acid selected from the group consisting of sulphur-containing acids of the formula

RSO_nH

wherein 1–90 percent by weight of the acid moieties of the blend of (a) and (b) are present in the acid and/or anhydride component of the graft copolymer; and

R is NR'''_2, a hydrocarbyl group, or a substituted hydrocarbyl group, and when the group is an aromatic group, any substituent containing an atom other than carbon, hydrogen or oxygen is located in a position which is other than meta- to the $-SO_nH$ group;

R''' is hydrogen or a hydrocarbyl group; and *n* is 2 or 3.

3,997,504
COMPOSITION AND METHOD FOR TREATING TEETH

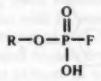
Richard W. Plymale, 1480 Griffin Road, Davison, Mich. 48423

Division of Ser. No. 130,438, April 1, 1971, Pat. No. 3,882,600. This application Feb. 20, 1975, Ser. No. 551,461

Int. Cl.² C08F *214/18, 230/02*

U.S. Cl. 260—42.27 **9 Claims**

1. A composition for bonding to tooth or bone tissue comprising a mixture of an organic phosphoryl monofluoride having the structural formula



wherein R is an unsaturated aliphatic addition-polymerizable group, and a material selected from the group consisting of the organic polymers, organic compounds capable of polymerization, and mixtures thereof.

3,997,505
FLAME RETARDANT POLYMERIC COMPOSITIONS CONTAINING PENTAERYTHRITOL CYCLIC DIPHOSPHATES OR DIPHOSPHORAMIDATES

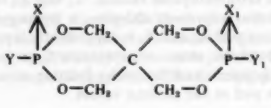
James A. Albright, Ann Arbor, Mich., assignor to Michigan Chemical Corporation, Chicago, Ill.

Continuation-in-part of Ser. No. 429,606, Jan. 2, 1974, abandoned. This application Nov. 17, 1975, Ser. No. 632,569

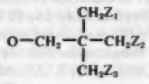
Int. Cl.² C08K *5/52*

U.S. Cl. 260—45.8 R **79 Claims**

1. A polymeric composition comprising a polymer and a flame retarding amount of a compound of the formula

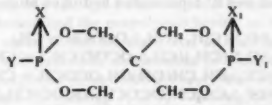


where X and X_1 are each oxygen or sulfur and Y and Y_1 are each



wherein Z_1 and Z_2 are independently selected from fluorine, chlorine, bromine, iodine, and hydrogen and wherein Z_3 is is selected from fluorine, chlorine, bromine, and iodine.

21. A polymeric composition comprising a polymer and a flame retarding amount of a compound of the formula



where X and X_1 are each oxygen or sulfur and Y and Y_1 are each

where R and R_1 are each monovalent hydrocarbon or halogenated monovalent hydrocarbon.

3,997,506
ANTI-MITOTIC AND ANTI-GOUT DERIVATIVES OF THIOCOLCHICINE

Pierre Dugat, Paris, France, assignor to Societe d'Etudes Chimiques an abrege Socechim, Luxemburg, Luxembourg

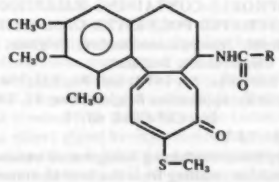
Filed July 7, 1975, Ser. No. 593,863

Claims priority, application United Kingdom, July 4, 1974, 29746/74

Int. Cl.² C07C *103/19, 97/16;* **A61K** *31/16*

U.S. Cl. 260—557 B **3 Claims**

1. A pharmaceutical composition having anti-mitotic and anti-gout activities consisting of an effective amount of an active ingredient of the formula:



wherein R is an adamantyl radical, said derivative having the following characteristics: melting point 272.5°–273.5° C, specific rotation $[\alpha]_D^{20} = -200.0°$ (in chloroform; concentration 0.500 gr/1); and giving a solvation adduct with ethyl acetate; in admixture with a pharmaceutically acceptable carrier.

3,997,507

NOVEL OIL AND WATER REPELLENT COMPOSITION

Kazusuke Kirimoto, and Takao Hayashi, both of Yokohama, Japan, assignors to Asahi Glass Co., Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 291,335, Sept. 22, 1972, abandoned. This application May 16, 1974, Ser. No. 470,576

Disclosure was also published under second Trial Voluntary Protest Program on Feb. 24, 1976

Int. Cl.[2] C08F *214/18, 216/18, 216/20*

U.S. Cl. 260—UY 2 Claims

1. An oil- and water-repellent composition, which comprises: a copolymer containing at least 25 weight percent, based on the total weight of monomers, of a fluoroalkyl monomer ester having the formula:

$$R_fR'OCOCR^2=CH_2$$

wherein R_f represents a straight or branched chain perfluoroalkyl group containing $C_{3\text{-}15}$ carbon atoms; R′ represents a straight or branched chain alkylene group containing $C_{1\text{-}10}$ carbon atoms; and R^2 represents a hydrogen atom or a methyl group,

$CF_3(CF_2)_7SO_2N(C_3H_7)(CH_2)_2OCOCH=CH_2$,
$CF_3(CF_2)_7SO_2N(CH_3)(CH_2)_2OCOC(CH_3)=CH_2$,
$(CF_3)_2CF(CF_2)_6CH_2CH(OH)CH_2OCOCH=CH_2$,
$(CF_3)_2CF(CF_2)_6CH_2CH(OCOCH_3)OCOC(CH_3)=CH_2$,
$F_2ClCF_2CF(CF_2)_7CONHCOOCH=CH_2$,
$H(CF_2)_{10}CH_2OCOCH=CH_2$, or
$CF_2Cl(CF_2)_{10}CH_2OCOC(CH_3)=CH_2$; and from 5 to 50 weight percent, based on the total weight of monomers, of an alkyl vinyl ether selected from the group consisting of chloromethylvinyl ether, bromomethylvinyl ether, 2-chloroethylvinyl ether and chloropropylvinyl ether.

3,997,508

IMPROVEMENTS IN TREATMENT OF HIGH-MOLECULAR-WEIGHT WATER-SOLUBLE COMPOUNDS WITH GLYOXAL

Horst Ziche, Dusseldorf, Germany, assignor to Henkel & Cie G.m.b.H., Dusseldorf-Holthausen, Germany

Filed Mar. 25, 1975, Ser. No. 561,941

Claims priority, application Germany, Mar. 30, 1974, 2415556

Int. Cl.[2] C08B *11/00, 15/00, 31/00;* C08G *12/22;* C08F *8/28*

U.S. Cl. 260—72 R 8 Claims

1. A process for the manufacture of glyoxal-treated, finely-powdered, water-soluble without formation of lumps, high-molecular-weight polymeric compounds consisting essentially of dry mixing finely-powdered water-soluble, high-molecular-weight polymeric compounds having particle sizes below 0.2 mm diameter and large amounts of reactive hydrogen atoms with from 0.2% to 5% by weight of a commercial polyglyoxal consisting of 5 to 10 glyoxal hydrate units and containing about 80% glyoxal, heating said dry mixture to from 60° C to 120° C for at least 30 minutes and recovering said glyoxal-treated, finely-powdered and water-soluble without formation of lumps, high-molecular-weight polymeric compounds.

3,997,509

PHOSPHORUS-CONTAINING HALOGENATED UNSATURATED POLYESTER COMPOSITIONS

Pierre Malfroid, Jemeppe-sur-Sambre, Belgium, assignor to Solvay & Cie, Brussels, Belgium

Filed Dec. 11, 1974, Ser. No. 531,798

Claims priority, application Belgium, Dec. 11, 1973, 138732

Int. Cl.[2] C08G *63/76*

U.S. Cl. 260—75 T 12 Claims

1. A phosphorus-containing halogenated unsaturated polyester composition resulting from the heat treatment of a halogenated unsaturated polyester prepared by copolymerization in the presence of a titanium tetrahalide of at least one α-epihalohydrin and maleic anhydride, used individually or as a mixture with another organic anhydride, the halogen of the polyester being selected from the group consisting of chlorine, bromine, and mixtures thereof, the said heat treatment being carried out, in the presence of an organic phosphite, at a temperature of between 50° and 200° C, said organic phosphite corresponding to the general formula

in which R_1, R_2 and R_3 represent C_1 to C_6 linear or branched, alkyl, haloalkyl or alkenyl radicals, or a phenyl radical.

3,997,510

FLAME-RESISTANT, THERMOPLASTIC POLYESTERS

Jürgen Habermeier, Pfeffingen, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Nov. 5, 1974, Ser. No. 521,126

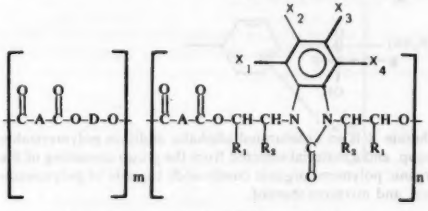
Claims priority, application Switzerland, Nov. 13, 1973, 15956/73

Disclosure was also published under second Trial Voluntary Protest Program on Feb. 10, 1976

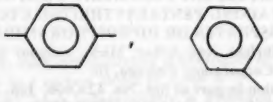
Int. Cl.[2] C08G *63/68*

U.S. Cl. 260—75 N 13 Claims

1. A flame-resistant, linear, thermoplastic polyester having a relative viscosity of 1.10 to 4.0 dl/g, measured at 30°C on a 1% strength solution consisting of equal parts of phenol and tetrachloroethane, and characterised by the general formula I



wherein A denotes a radical of the formulae



$-(CH_2)_2-$ or $-(CH_2)_4-$, or a mixture of the above mentioned A radicals; D represents an aliphatic alkylene radical with 2 to 12 carbon atoms or the 1,4-dimethylenecyclohexane radical, or a mixture of the aforementioned D radicals; R_1 each denote a hydrogen atom, or the methyl, ethyl or phenyl group and R_2 denotes a hydrogen atom or together with R_1 denotes the tetramethylene radical, X_1 and X_4 independently of one another represent chlorine, a hydrogen atom or a bromine atom and X_2 and X_3 independently represent a chlorine or a bromine atom, *m* represents 0 or integers and n represents integers, and the molar fraction $n/(n+m)$ determined by *n* and *m* can assume values

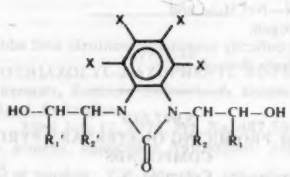
3,997,511

UNSATURATED LINEAR POLYESTERS

Hans Batzer, Arlesheim, and Jurgen Habermeier, Pfeffingen, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Nov. 5, 1974, Ser. No. 521,128
Claims priority, application Switzerland, Nov. 13, 1973, 15954/73; Aug. 6, 1974, 10736/74
Disclosure was also published under second Trial Voluntary Protest Program on Feb. 10, 1976
Int. Cl.² C08G *63/68*
U.S. Cl. 260—75 N 4 Claims

1. An unsaturated, flame-retardant, linear polyester consisting essentially in the total condensed acid component of at least 20 mol % of an unsaturated dicarboxylic acid selected from the group consisting of maleic, fumaric, itaconic, citraconic and dimethylmaleic acids and up to 80 mol % of a saturated aromatic or aliphatic dicarboxylic acid selected from the group consisting of phthalic, terephthalic, isophthalic, 2,5-dibromoterephthalic, succinic, glutaric, adipic, pimelic, suberic, azelaic and sebacic acids; and in the total condensed diol component of at least 18 mol % of a brominated or of at least 47 mol % of a chlorinated benzimidazolone diol of formula I



(I)

wherein X independently denotes bromine or chlorine, R_1 and R_1' each denotes hydrogen, methyl, ethyl or phenyl, and R_2 and R_2' each denotes hydrogen or R_1 together with R_2 and R_1' together with R_2' each denote trimethylene or tetramethylene; the amount of diol of formula I incorporated in said polyester being that required to bring the bromine content of said polyester to at least 15 weight % or the chlorine content to at least 20 weight %; and with the remaining condensed diol component selected from the group consisting of ethylene glycol, diethylene glycol, polyethylene glycol of up to 24 carbon atoms, propylene glycol, dipropylene glycol, polypropylene glycol of up to 24 carbon atoms, 1,4-butanediol, 1,12-dodecanediol, neopentyl glycol and 1,4-cyclohexanediol.

3,997,512

HIGH MOLECULAR WEIGHT POLYESTER RESIN, THE METHOD OF MAKING THE SAME

Donald J. Casey, Ridgefield, and George C. Gleckler, Stamford, both of Conn., assignors to American Cyanamid Company, Stamford, Conn.

Continuation of Ser. No. 418,138, Nov. 21, 1973, abandoned. This application Jan. 14, 1976, Ser. No. 648,988
Int. Cl.² C08G *63/12*, *63/52*
U.S. Cl. 260—75 R 10 Claims

1. A normally-solid, biodegradable, hydrolyzable polyester resin of diglycolic acid and an unhindered glycol having a molecular weight sufficiently high so as to provide a polymeric material possessing self-supporting film forming properties.

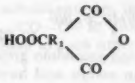
3,997,513

SOLUTION FOR FORMING THERMAL RESISTING POLYMERS

Yuzuru Noda; Makoto Kojima; Shiro Mazaki, and Yasutada Katashiba, all of Ibaragi, Japan, assignors to Nitto Electric Industrial Co., Ltd., Ibaragi, Japan

Continuation of Ser. No. 347,761, April 4, 1973, Pat. No. 3,896,089. This application Dec. 6, 1974, Ser. No. 530,099
Claims priority, application Japan, Apr. 4, 1972, 47-34046
Int. Cl.² C08G *22/32*
U.S. Cl. 260—77.5 TB 15 Claims

1. A solution for forming thermal resisting polymers comprising a mixture of a prepolymer and blocked polyisocyanate compound blocked with a compound of the formula ROH wherein R represents a monovalent aromatic group or a monovalent aliphatic group in approximately stoichiometric equivalent amount to said prepolymer, said mixture being dissolved in an organic acidic solvent, said prepolymer having been prepared by reacting an organic diisocyanate or diamine and a molar excess of 1, 2, 3, 4-butane-tetracarboxylic acid or an anhydride thereof and the prepolymer having an imide group in the main chain of the molecule and an acid group at the terminals of said molecule, said blocked polyisocyanate being a blocked compound of an imide group-containing polyisocyanate prepared by reacting 1, 2, 3, 4-butane-tetracarboxylic acid or an anhydride thereof with a molar excess amount of an organic diisocyanate or said blocked polyisocyanate being a blocked compound of an amide or imide group-containing polyisocyanate having isocyanate groups at both terminals of the molecule prepared by reacting the organic tribasic acid anhydride represented by the general formula



wherein R_1 represents a trivalent organic group with a molar excess amount of an organic diisocyanate.

3,997,514

POLYURETHANE ELASTOMERS HAVING A COMPRESSION SET OF 50 OR LESS

Irving Charles Kogon, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Apr. 30, 1975, Ser. No. 573,599
Int. Cl.² C08G *18/32*, *18/75*
U.S. Cl. 260—77.5 AM 1 Claim

1. In a process wherein 2,4-tolylene diisocyanate is reacted with a poly(tetramethylene ether) glycol to form an NCO-terminated polyurethane prepolymer and the latter is cured to form a polyurea/polyurethane elastomer, the improvement of preparing said prepolymer in two steps in the first of which the diisocyanate is mixed with a stoichiometric excess of poly(tetramethylene ether) glycol having a molecular weight of about 1000, and said mixture is heated to a temperature sufficient to effect a reaction between said isocyanate and said glycol; in the second step, a stoichiometric excess of methylenebis-4-cyclohexylisocyanate is added, and the mixture is heated to form an NCO-terminated polyurethane prepolymer; and said prepolymer is cured with 4,4'-methylenedianiline to form a vulcanizate having a compression set of 50 or less.

3,997,515

FLAME RETARDANT SHAPED MATERIALS

Kenzo Kosaka; Haruo Miyamoto; Osamu Nakagawa; Susumu Maekawa; Tokuhisa Miyamatsu, and Yasuhiko Hiromoto, all of Nagoya, Japan, assignors to Mitsubishi Rayon Co., Ltd., Tokyo, Japan

Filed May 10, 1974, Ser. No. 468,869

Claims priority, application Japan, May 14, 1973, 48-53284; May 22, 1973, 48-57482

Int. Cl.[2] C08F *28/00*, *18/00*, *120/00*, *226/00*

U.S. Cl. 260—79.3 M 10 Claims

1. A flame retardant, shaped material comprising: a vinyl polymer containing COOH, CN, $CONH_2$ or COOR' groups, wherein R' is alkyl, and wherein a portion of these groups are covalently crosslinked to an extent sufficient only to impart solvent resistance to the shaped material; the vinyl units of said polymer contain at least 40 mole % based on said polymer of COOH groups, and wherein sufficient COOH groups have been converted to COOM groups where M is a di or trivalent metal ion, such that said polymer contains 1 to 30% by weight of said di or tri-valent metal based on the polymer; and the remaining COOH groups are completely or partially converted to $COONH_4$ groups.

3,997,516

METHOD FOR PROTECTING GUANIDINO GROUP AND RESTORING THE SAME

Osamu Nishimura, Osaka, Japan, assignor to Takeda Chemical Industries, Ltd., Osaka, Japan

Filed June 27, 1975, Ser. No. 590,948

Claims priority, application Japan, July 4, 1974, 49-77117; Feb. 25, 1975, 50-23664

Int. Cl.[2] C07C *103/52*, *149/40*, *63/00*

U.S. Cl. 260—112.5 R 17 Claims

1. In an amino acid having a protected guanidino group or a peptide containing the residue of an amino acid having a protected guanidino group the improvement according to which the protective grouping is a lower alkoxybenzenesulfonyl group or a tri-lower alkylbenzenesulfonyl group.

3,997,517

CYCLIC SOMATOSTATIN DISULFIDE ANALOGUES

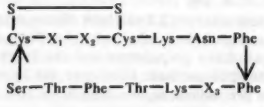
Dimitrios Sarantakis, West Chester, Pa., assignor to American Home Products Corporation, New York, N.Y.

Filed Jan. 30, 1976, Ser. No. 653,685

Int. Cl.[2] C07C *103/52*; A61K *37/00*

U.S. Cl. 260—112.5 S 11 Claims

1. A compound of the formula:



in which each of the identified optically active amino acid moieties is in the L-configuration;

X_1 is L-Ala, Gly-L-Ala, Gly_2-L-Ala, Gly_3-L-Ala, Gly-Gly, Gly-Gly-L-Tyr-L-Ala, D-Ala-Gly-Gly-L-Tyr, D-Phe-L-Phe_3-L-Ala, L-Phe_3-L-Ala or L-Phe-L-Phe;

X_2 is Gly, 2-methyl-Ala or L-Phe; and

X_3 is L-Trp or D-Trp,

or a pharmaceutically acceptable acid addition salt thereof.

3,997,518

2-ALKYL-4-CARBOXYALKYL-5-(3,3'-DIMETHYL-TRIAZENO)-IMIDAZOLES

James Heyes, Peaslake, and Neal Ward, Walton-on-the-Hill, both of England, assignors to Beecham Group Limited, Great Britain

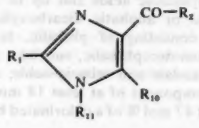
Continuation of Ser. No. 289,610, Sept. 18, 1972, abandoned, which is a continuation-in-part of Ser. No. 205,345, Dec. 6, 1971, abandoned. This application Nov. 27, 1974, Ser. No. 527,581

Claims priority, application United Kingdom, Dec. 9, 1970, 58385/70; Sept. 29, 1971, 45309/71

Int. Cl.[2] A61I *27/00*; C07C *115/00*

U.S. Cl. 260—140 R 4 Claims

1. A compound of the formula



wherein

R_1 is methyl;

R_2 is alkoxyl of 1 to 4 carbon atoms;

R_{10} is N=N—$N(CH_3)_2$; and

R_{11} is hydrogen;

or a pharmaceutically acceptable, nontoxic acid addition salt or mono-hydrate thereof.

3,997,519

METHOD OF PRODUCING QUATERNARY PYRIDINIUM COMPOUNDS

Robert F. Armbruster, Columbia, N.Y., assignor to GAF Corporation, New York, N.Y.

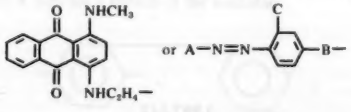
Continuation of Ser. No. 253,134, May 15, 1972, abandoned. This application June 20, 1974, Ser. No. 481,382

Int. Cl.[2] C09B *43/00*; C07D *213/20*

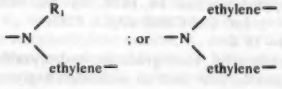
U.S. Cl. 260—155 2 Claims

1. A method for preparing a quaternary pyridinium product compound having the formula:

wherein R represents alkyl,

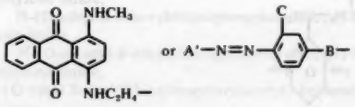


in which A is phenyl, naphthyl, carbostyrilyl, pyrazolinyl and substituted derivatives thereof where the substituents are selected from the group consisting of methyl, NO_2, Cl, phenyl, nitrophenyl and methyl sulfonate; B is -O-ethylene-,



and C is selected from the group consisting of H, $NHCOCH_3$

and, when B is -O-ethylene-, C can also be $-OC_2H_4-$, where R_1 is methyl or ethyl, and wherein R_4 represents alkyl having 1 to 4 carbon atoms, bromophenyl, methylphenyl or naphthyl; *m* represents an integer of 1 or 2 and *m'* is equal to *m*, which comprises: contacting pyridine and a hydroxy-containing compound having the formula: $R'-(OH)_n$ wherein R' represents alkyl,



in which A' is phenyl, naphthyl, carbostyrilyl, pyrazolinyl and substituted derivatives thereof where the substituents are selected from the group consisting of methyl, NO_2, Cl, phenyl, nitrophenyl and hydroxy, and *n* is an integer of 1 or 2 and is equivalent to m defined above, and B and C are as defined above; reacting the pyridine and said hydroxy-containing compound in the presence of a sulfonyl halide having the formula: R_4SO_2X wherein R_4 is as defined above and X is Cl, Br or F; and conducting the reaction at an elevated temperature up to the reflux temperature of the reaction mixture.

3,997,520

5-NITROTHIAZOLYL-2-AZOPHENYL DISPERSE DYES

Ruedi Altermatt, Buckten, Switzerland, assignor to Sandoz Ltd., Basel, Switzerland

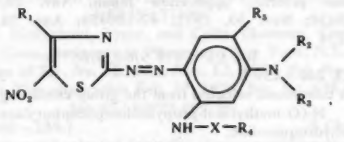
Filed July 11, 1974, Ser. No. 487,586

Claims priority, application Switzerland, July 17, 1973, 10388/73

Int. Cl.² C09B *29/36*

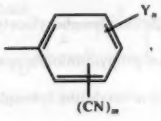
U.S. Cl. 260—158 **14 Claims**

1. A compund of the formula



wherein

R_1 is hydrogen, alkyl of 1 to 6 carbon atoms or



wherein each

Y is independently chloro or bromo,

m is 0 or 1, and

n is 0 to 3,

each of R_2 and R_3 is independently hydrogen, alkenyl of 2 to 6 carbon atoms, cycloalkyl of 5 to 7 carbon atoms, alkyl of 1 to 6 carbon atoms or alkyl of 1 to 6 carbon atoms monosubstituted by cycloalkyl of 5 to 8 carbon atoms or cycloalkenyl of 5 to 8 carbon atoms, with the proviso that at least one of R_2 and R_3 is other than hydrogen,

R_4 is chloroethyl or bromoethyl,

R_5 is hydrogen, methoxy or ethoxy, and

X is —CO— or —CO—O—.

3,997,521

BIS-(DIALKOXYCARBONYL-PHENYLAZO)ACETOACETAMIDOARYLENES

Willy Forter, Allschwil, and Juergen Goldmann, Muenchenstein, both of Switzerland, assignors to Sandoz Ltd., Basel, Switzerland

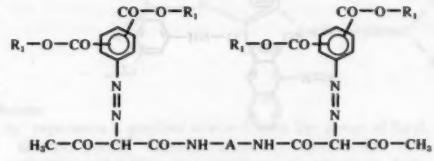
Continuation-in-part of Ser. No. 90,027, Nov. 16, 1970, abandoned. This application Aug. 7, 1972, Ser. No. 278,274

Claims priority, application Switzerland, Dec. 3, 1969, 18000/69; Dec. 4, 1969, 18072/62; Feb. 4, 1970, 1557/70

Int. Cl.² C09B *33/14, 31/10;* **D06P** *1/18, 3/42*

U.S. Cl. 260—176 **9 Claims**

1. A compound of the formula



wherein each

R_1 is alkyl of 1 to 3 carbon atoms, and

A is phenylene, phenylene substituted by fluoro, chloro, bromo, methyl, methoxy, ethoxy, trifluoromethyl or cyano, diphenylene, diphenylene substituted by chloro, bromo, methyl or methoxy or naphthylene, with the provisos that (1) when A is substituted phenylene or substituted diphenylene having more than one substituent, the substituents are the same or different, and (2) the two —CO—O—R_1 groups on each benzene ring are meta or para to each other.

3,997,522

DISAZO DYESTUFFS

Edgar Siegel, and Horst Nickel, both of Leverkusen, Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

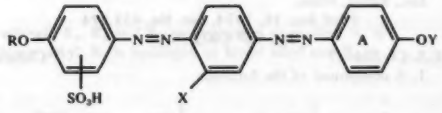
Continuation of Ser. No. 39,913, May 22, 1970, abandoned. This application Jan. 31, 1973, Ser. No. 328,436

Claims priority, application Germany, May 31, 1969, 1927918

Int. Cl.² C09B *31/06;* **D06P** *3/24*

U.S. Cl. 260—186 **5 Claims**

1. Disazo dyestuff which in the form of the free acid has the formula



in which

R is alkyl having 1–4 carbon atoms;

X is hydrogen or methyl;

Y is alkyl having 1–4 carbon atoms; and

the ring A is unsubstituted or once or twice substituted by chlorine or alkyl having 1–4 carbon atoms.

3,997,523

MONOAZO PIGMENTS

Günter Laubert, Frankfurt am Main, and Joachim Ribka, Offenbach (Main), both of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

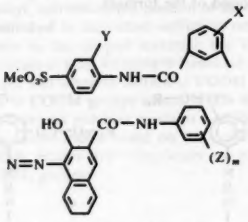
Filed Jan. 22, 1973, Ser. No. 325,656

Claims priority, application Germany, Jan. 22, 1972, 2203094

Int. Cl.[2] C09B 29/20

U.S. Cl. 260—203 7 Claims

1. A compound of the formula



wherein Me is one molar equivalent of calcium, strontium, barium or manganese, Y is hydrogen, chlorine, lower alkyl or lower alkoxy,

X is hydrogen, chlorine, lower alkyl, lower alkoxy, trifluoromethyl, cyano or carbomethoxy,

Z represents the same or different substituents selected from the group consisting of chlorine, lower alkyl, lower alkoxy, lower alkanoylamino and benzoylamino and *m* is 1, 2 or 3.

3,997,524

PROCESS FOR THE MANUFACTURE OF 6'-N-ALKYL DERIVATIVES OF SISOMICIN AND VERDAMICIN; NOVEL INTERMEDIATES USEFUL THEREIN, AND NOVEL 6'-N-ALKYLVERDAMICINS PREPARED THEREBY

Tattanahalli Lakshminarayan Nagabhushan, Parsippany, N.J., assignor to Schering Corporation, Kenilworth, N.J.

Filed May 2, 1975, Ser. No. 574,072

Int. Cl.[2] C07H 15/22

U.S. Cl. 536—17 9 Claims

1. A compound selected from the group consisting of 1,3,2',3''-tetra -N-X-6'-N-(2,4-dinitrophenyl)-sisomicin and 1,3,2',3''-tetra-N-X-6'-N-(2,4-dinitrophenyl)verdamicin wherein X is a member selected from the group consisting of lower alkanoyl, benzoyl, nitrobenzoyl, methoxybenzoyl, toluyl, lower akoxycarbonyl, chloroacetyl and trichloroethoxycarbonyl.

3,997,525

TETRA-^{125}IODO-DI-TYRAMINE OF DIGITALIS DERIVATIVE AND PROCESS FOR MAKING THE SAME

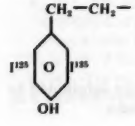
Terrance Judd Guy, Minneapolis, Minn., assignor to Bio-Tec, Inc., Edina, Minn.

Filed Jan. 16, 1974, Ser. No. 433,874

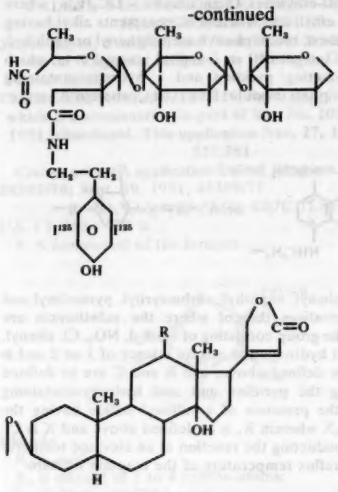
Int. Cl.[2] C07J 19/00

U.S. Cl. 536—7 7 Claims

1. A compound of the formula:



-continued



wherein R is selected from the group consisting of hydrogen and hydroxyl.

3,997,526

AMIDO PHOSPHOROTHIOLATE PESTICIDE

Takeo Satomi, Nishinomiya; Naganori Hino; Masachika Hirano, both of Toyonaka; Kunio Mukai, Nishinomiya; Hideo Sakamoto, Toyonaka, and Ryo Yoshida, Minoo, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Filed Nov. 15, 1973, Ser. No. 416,205

Claims priority, application Japan, Nov. 30, 1972, 47-120438; Nov. 30, 1972, 47-120439; Apr. 26, 1973, 48-48234

Int. Cl.[2] C07F 9/60, 9/65

U.S. Cl. 260—239 B 3 Claims

1. A compound selected from the group consisting of

1. N-(O-methyl-S-n-propyldithiolphosphorylacetyl)-tetrahydroquinoline,
2. N-(O-methyl-S-n-butyldithiolphosphorylacetyl)-tetrahydroquinoline,
3. N-(O-methyl-S-n-pentyldithiolphosphorylacetyl)-tetrahydroquinoline,
4. N-(O-methyl-S-n-hexyldithiolphosphorylacetyl)-tetrahydroquinoline,
5. N-(O-diethyldithiolphosphorylacetyl)-tetrahydroquinoline,
6. N-(O-ethyl-S-n-propyldithiolphosphorylacetyl)-tetrahydroquinoline,
7. N-(O-ethyl-S-n-butyldithiolphosphorylacetyl)-tetrahydroquinoline,
8. N-(O-ethyl-S-iso-butyldithiolphosphorylacetyl)-tetrahydroquinoline,
9. N-(O-ethyl-S-iso-pentyldithiolphosphorylacetyl)-tetrahydroquinoline,
10. N-(O-ethyl-S-n-pentyldithiolphosphorylacetyl)-tetrahydroquinoline,
11. N-(O-ethyl-S-n-hexyldithiolphosphorylacetyl)-tetrahydroquinoline,
12. N-(O-butyl-S-ethyldithiolphosphorylacetyl)-tetrahydroquinoline,
13. N-(O-methyl-S-n-butyldithiolphosphorylacetyl)-hexamethylene imine,
14. N-(O,S-diethyldithiolphosphorylacetyl)-hexamethylene imine,

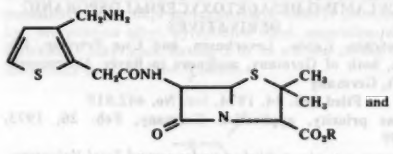
15. N-(O-ethyl-S-n-propyldithiolphosphorylacetyl)-hexamethylene imine,
16. N-(O-ethyl-S-n-butyldithiolphosphorylacetyl)-hexamethylene imine,
17. N-(O-ethyl-S-iso-butyldithiolphosphorylacetyl)-hexamethylene imine,
18. N-(O-ethyl-S-sec-butyldithiolphosphorylacetyl)-hexamethylene imine,
19. N-(O-ethyl-S-n-pentyldithiolphosphorylacetyl)-hexamethylene imine,
20. N-(O-ethyl-S-n-hexyldithiolphosphorylacetyl)-hexamethylene imine,
21. N-(O-n-butyl-S-ethyldithiolphosphorylacetyl)-hexamethylene imine,
22. N-(O-ethyl-S-allyldithiolphosphorylacetyl)-hexamethylene imine,
23. N-(O-ethyl-S-methyldithiolphosphorylacetyl)-hexamethylene imine,
24. N-(O-ethyl-O-phenylthiolphosphorylacetyl)-tetrahydroquinoline,
25. N-(O-ethyl-O-metatolylthiolphosphorylacetyl)-tetrahydroquinoline,
26. N-(O-ethyl-O-orthotolylthiolphosphorylacetyl)-tetrahydroquinoline,
27. N-(O-ethyl-O-3,5-xylenylthiolphosphorylacetyl)-tetrahydroquinoline,
28. N-(O-ethyl-O-parachlorophenylthiolphosphorylacetyl)-tetrahydroquinoline,
29. N-(O-n-propyl-O-phenylthiolphosphorylacetyl)-tetrahydroquinoline,
30. N-(O-n-propyl-O-orthotolylthiolphosphorylacetyl)-tetrahydroquinoline,
31. N-(O-n-butyl-O-phenylthiolphosphorylacetyl)-tetrahydroquinoline,
32. N-(O-n-butyl-O-metatolylthiolphosphorylacetyl)-tetrahydroquinoline, and
33. N-(O-butyl-O-paraethylphenylthiolphosphorylacetyl)-tetrahydroquinoline.

3,997,527
AMINOMETHYLARYLMETHYLPENICILLIN DERIVATIVES

James W. McFarland, Lyme, and Colin Thomson, Groton, both of Conn., assignors to Pfizer Inc., New York, N.Y.

Division of Ser. No. 523,024, Nov. 12, 1974, Pat. No. 3,966,710. This application Feb. 17, 1976, Ser. No. 658,384
Int. Cl.² C07D *499/58*
U.S. Cl. 260—239.1 8 Claims

1. A compound selected from the group consisting of:



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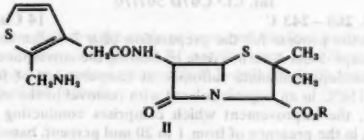


II

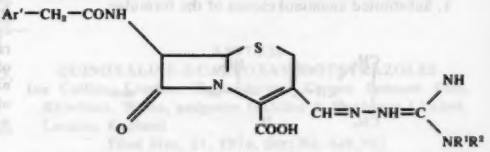
and the pharmaceutically acceptable salts thereof, wherein R is selected from the group consisting of hydrogen, 1-(alkanoyloxy)alkyl said alkanoyl having from 2 to 8 carbon atoms and said alkyl having from 1 to 3 carbon atoms and phthalidyl.

3,997,528
CEPHALOSPORIN COMPOUNDS

Mitsuru Yoshioka, Toyonaka; Masayuki Murakami, Itami; Yuji Sendo, Nishinomiya; Sadao Miyazaki, Toyonaka, and Koji Ishikura, Amagasaki; all of Japan, assignors to Shionogi & Co., Ltd., Osaka, Japan

Filed Oct. 22, 1974, Ser. No. 517,483
Claims priority, application Japan, Oct. 25, 1973, 48-12032
Int. Cl.² C07D *501/20*
U.S. Cl. 260—240 G 12 Claims

1. A member of the group consisting of a compound of the formula



wherein

Ar′ represents a member selected from the group of furyl, thienyl, pyrryl, oxazolyl, isoxazoyl, oxadiazolyl, oxatriazolyl and said groups substituted by a hydroxy, halogen or methyl group, and

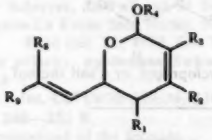
—NR^1R^2 is a ring system group selected from the following groups (1) pyrrolidin-1-yl, (2) piperidin-1-yl, (3) 1-azacyclohelptan-1yel, (4) pyrrolin-1-yl, (5) tetrahydropyridin-1-yl, (6) morpholin-4-yl, (7) tetrahydro-1,2-oxazin-2-yl, (8) tetrahydro-1,3-oxazin-3-yl, (9) tetrahydroisoxazol-2-yl, (10) tetrahydrooxazol-3-yl, (11) tetrahydroisothiazol-2-yl, (12) tetrahydrothiazol-3-yl, (13) tetrahydro-1,3-thiazin-3-yl, and (14) tetrahydro-1,4-thiazin-4-yl, said groups being unsubstituted or substituted by a member selected from the group consisting of alkyl of 1 to 6 carbon atoms, oxo, hydroxy, halogen, carbalkoxy, and carbamoyl and a pharmaceutically acceptable salt thereof.

3,997,529
INTERMEDIATE COMPOUNDS FOR THE PREPARATION OF POLYENE ALDEHYDES

Gary Lee Olson, Westfield, N.J., assignor to Hoffmann-La Roche Inc., Nutley, N.J.

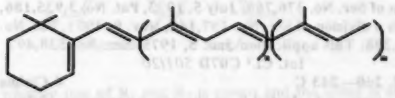
Continuation-in-part of Ser. No. 594,377, July 9, 1975, abandoned. This application Oct. 1, 1975, Ser. No. 618,708
Int. Cl.³ C07D *309/32*, *309/36*
U.S. Cl. 260—240 R 3 Claims

1. A compound of the formula:



IV

wherein R_1, R_2 and R_3 are hydrogen or methyl, R_4 is lower alkyl; R_5 is hydrogen or lower alkyl and R_6 is



where m and n are integers from 0 to 1.

3,997,530
SUBSTITUTED ENAMINOKETONES

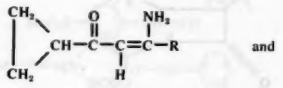
William Joseph Fanshawe, Pearl River; Lantz Stephen Crawley, Spring Valley, both of N.Y.; Sidney Robert Safir, River Edge, N.J.; Gretchen Ellen Wiegand, deceased, late of Pearl River, N.Y., and by Earle Clifford Cooley, executor, Hingham, Mass., assignors to American Cyanamid Company, Stamford, Conn.

Continuation-in-part of Ser. No. 491,449, July 24, 1974, Pat. No. 3,957,805. This application Mar. 25, 1976, Ser. No. 670,324

Int. Cl.² C07D *213/38, 213/50, 241/00*

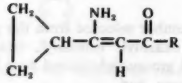
U.S. Cl. 260—240 R **7 Claims**

1. Substituted enaminoketones of the formulae:



and

(I)



(II)

wherein R is selected from the group consisting of pyridyl and pyrazinyl.

3,997,531
2,1,3-BENZOTHIADIAZIN-(4)-ONE-2,2-DIOXIDES

Adolf Fischer, Mutterstadt; Karl-Heinz Koenig, Frankenthal, and Gerhard Hamprecht, Mannheim, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany

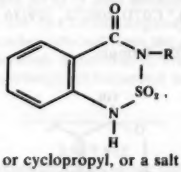
Filed Sept. 16, 1974, Ser. No. 506,559

Claims priority, application Germany, Sept. 29, 1973, 2349114

Int. Cl.² C07D *285/16*

U.S. Cl. 260—243 R **2 Claims**

1. A compound of the formula



where R sec-butyl or cyclopropyl, or a salt thereof.

3,997,532
INTERMEDIATES FOR PRODUCING SEMI-SYNTHETIC CEPHALOSPORINS

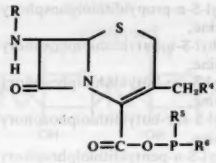
John H. Sellstedt, King of Prussia, Pa., assignor to American Home Products Corporation, New York, N.Y.

Division of Ser. No. 376,788, July 5, 1973, Pat. No. 3,935,186, which is a division of Ser. No. 197,142, Nov. 9, 1971, Pat. No. 3,859,298. This application Jan. 3, 1975, Ser. No. 538,497

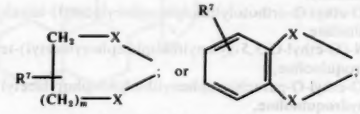
Int. Cl.² C07D *501/20*

U.S. Cl. 260—243 C **4 Claims**

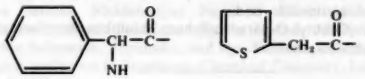
1. A compound selected from the group consisting of those having the following formula and the acid addition salts thereof:



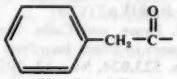
wherein: R is an organic acyl radical derived from an organic carboxyl acid or a reactive derivative thereof; R^4 is selected from the class consisting of hydrogen, (lower)alkanoyloxy containing 2 to 8 carbon atoms, and a quaternary ammonium radical; R^5 and R^6 are each selected from the class consisting of (lower)alkyl, phenyl, naphthyl, phenyl (lower)alkyl and naphthyl(lower)alkyl; R^7 is selected from the class consisting of hydrogen and (lower)alkyl; R^5 and R^6 when joined together with phosphorus form the ring



wherein X is selected from the class consisting of oxygen, methylene and sulfur; *m* is an integer from 1 to 6; and wherein said organic acyl defined by R is selected from the group consisting of



and



3,997,533
PROCESS FOR THE PREPARATION OF 7-ACYLAMINO-DESACETOXYCEPHALOSPORANIC DERIVATIVES

Hans-Joachim Kabbe, Leverkusen, and Uwe Petersen, Cologne, both of Germany, assignors to Bayer Aktiengesellschaft, Germany

Filed Feb. 14, 1974, Ser. No. 442,810

Claims priority, application Germany, Feb. 26, 1973, 2309599

Disclosure was also published under second Trial Voluntary Protest Program on Feb. 24, 1976

Int. Cl.² C07D *501/10*

U.S. Cl. 260—243 C **14 Claims**

1. In the process for the preparation of a 7-acylamido-3-methylceph-3-em-4-carboxylate by heating the corresponding 6-acylamidopenicillanate sulfoxide at temperatures of from 60° to 150°C in an organic solvent with removal of the water formed, the improvement which comprises conducting the heating in the presence of from 1 to 20 mol percent, based on the sulfoxide present, of a heavy metal sulfonate of the formula:

$$Me(R''SO_3)_n$$

in which

Me is a cation having a valence of 1 to 3 and selected from the group consisting of the copper, silver, gold, zinc, cad-

mium, mercury thallium, tin, lead, iron, cobalt and nickel cations;

R'' is alkyl of 1 to 4 carbon atoms, fluoroalkyl of 1 to 4 carbon atoms, phenyl, naphthyl or phenyl or naphthyl substituted by at least one substituent selected from the group consisting of methyl and halo; and

n has a value of 1 to 3 and corresponds to the valence of Me.

3,997,534

SUBSTITUTED TRIAZINO-BENZIMIDAZOLES

Hans Röchling, Altenhain, Taunus; Kurt Härtel, Hofheim, Taunus; Reinhard Kirsch, Niederjosbach, Taunus, and Dieter Düwel, Hofheim, Taunus, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

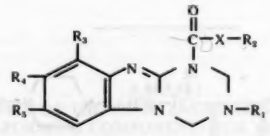
Filed Nov. 7, 1974, Ser. No. 521,899

Claims priority, application Germany, Nov. 10, 1973, 2356258

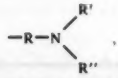
Int. Cl.² C07D *251/72*

U.S. Cl. 260—249.5 **17 Claims**

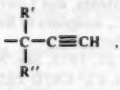
1. A triazinobenzimidazole of the formula



wherein R_1 is straight-chain or branched alkyl having 1 to 18 carbon atoms; straight-chain or branched alkenyl having 3 to 18 carbon atoms; cycloalkyl having 3 to 12 carbon atoms; cycloalkyl having 3 to 12 carbon atoms and substituted by at least one alkyl having 1 to 4 carbon atoms or by hydroxy; tricyclo-[5,2,1,$0^{2,6}$]-decyl; phenylalkyl or diphenylalkyl each having 1 to 6 carbon atoms in the alkyl; phenyl-substituted phenylalkyl or phenyl-substituted diphenylalkyl each having 1 to 6 carbon atoms in the alkyl and in which the substituents in the phenyl are halogen, alkyl having 1 to 4 carbon atoms, alkoxy having 1 to 4 carbon atoms, or alkylthio having 1 to 4 carbon atoms; phenyl; phenyl substituted by alkyl having 1 to 4 carbon atoms, halogen, halogenoalkyl having 1 to 4 carbon atoms, hydroxyl, alkoxy having 1 to 4 carbon atoms, phenoxy, or alkylthio having 1 to 4 carbon atoms; naphthyl; naphthyl substituted by alkyl having 1 to 4 carbon atoms, halogen, halogenoalkyl having 1 to 4 carbon atoms, hydroxyl, alkoxy having 1 to 4 carbon atoms, phenoxy, or alkylthio having 1 to 4 carbon atoms; furfuryl; or R_1 is hydroxyalkyl, alkoxyalkyl, polyalkoxyalkyl, alkyl mercaptoalkyl, dialkyl phosphinyl alkyl, morpholino alkyl, pyrrolidino alkyl, piperidino alkyl, or carbalkoxy alkyl each having 2 to 12 carbon atoms; or R_1 is dialkylaminoalkyl of the formula



wherein R is straight-chain or branched alkylene having 2 to 6 carbon atoms and R' and R'' are the same or different alkyl having 1 to 4 carbon atoms; or is 1',1'-dialkyl-substituted propin-2'-yl of the formula



wherein R' and R'', taken alone, are alkyl having 1 to 4 carbon atoms, phenyl, or substituted phenyl, or wherein R' and R'', taken together, are 5- to 8-membered cycloalkyl substituted by alkinyl having 2 to 3 carbon atoms, or are bicycloheptenyl methyl, exo-bicycloheptylmethyl, endo-bicycloheptylmethyl, bicycloheptyl or tricyclo-decenyl;

R_2 is methyl;

R_3 is hydrogen;

R_4 is phenylthio;

R_5 is hydrogen; and

X is oxygen.

3,997,535

QUINOXALINE-2-CARBOXAMIDOTETRAZOLES

Ian Collins, London, England, and Gwynn Pennant Ellis, Rhiwbina, Wales, assignors to Allen & Hanburys Limited, London, England

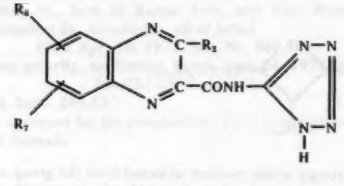
Filed Mar. 11, 1974, Ser. No. 449,992

Claims priority, application United Kingdom, Mar. 16, 1973, 12742/73; Mar. 16, 1973, 12743/73

Int. Cl.² C07D *241/00*

U.S. Cl. 260—250 Q **17 Claims**

1. A compound of the formula



or a pharmaceutically acceptable salt thereof in which: R_2 represents a hydrogen atom, a halogen atom, an alkyl group or the group OR_3, where R_3 is a hydrogen atom, an alkyl group or an alkyl group substituted by at least one alkoxy or hydroxy group; and R_6 and R_7 which may be the same or different each has the same meaning as R_2.

3,997,536

PHENYL-PYRIMIDINES

Arthur Boller, Binningen; Marco Cereghetti, Basel, and Hanspeter Scherrer, Therwil, all of Switzerland, assignors to Hoffmann-La Roche Inc., Nutley, N.J.

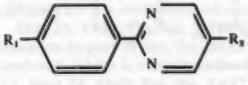
Filed Oct. 21, 1975, Ser. No. 624,354

Claims priority, application Switzerland, Oct. 25, 1974, 14313/74

Int. Cl.² C07D *239/26, 239/28, 239/36*

U.S. Cl. 260—251 R **18 Claims**

1. A compound of the formula



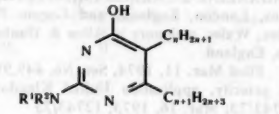
wherein one of R_1 and R_2 is cyano and the other is straight-chain alkyl of 3 to 9 carbon atoms, straight-chain alkoxy of 2 to 9 carbon atoms or straight-chain alkanoyloxy of 2 to 9 carbon atoms.

3,997,537
PROCESS OF PREPARING 2-AMINO-4-HYDROXY-5(AND/OR 6)-ALKYL SUBSTITUTED PYRIMIDINES

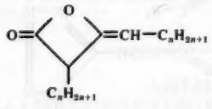
David Rees Parry, Wokingham, and Alfred Glyn Williams, Basingstoke, both of England, assignors to Imperial Chemical Industries Limited, London, England

Filed May 12, 1975, Ser. No. 576,572
Claims priority, application United Kingdom, May 20, 1974, 22423/74
Int. Cl.² C07D *239/36*
U.S. Cl. 260—256.4 C 5 Claims

1. Process for the preparation of a compound of formula:-



wherein *n* is zero or an integer from 1 to 12 and R^1 and R^2 are hydrogen or lower alkyl, which comprises the step of treating a mixture of a diketene of formula:-



and a strongly acidic medium selected from the group consisting of concentrated sulphuric acid and oleum with a compound of formula:-

$NH{=}C(NH_2)NR^1R^2$

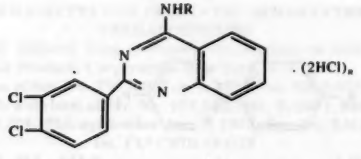
or the sulphate thereof.

3,997,538
2-(3,4-DICHLOROPHENYL)-4-(SUBSTITUTED AMINO)-QUINAZOLINES

Robert J. Alaimo, Norwich, N.Y., assignor to Morton-Norwich Products, Inc., Norwich, N.Y.

Filed Dec. 29, 1975, Ser. No. 644,619
Int. Cl.² C07D *239/94*
U.S. Cl. 260—256.4 B 6 Claims

1. A compound of the formula:

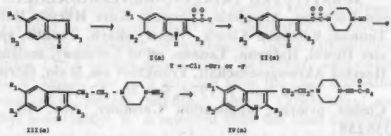


wherein R is (1-pyrrolidinyl)propyl; 3-[bis-(2-hydroxyethyl-)amino]propyl; 2,3-dihydroxypropyl; 3-diethylamino-2-hydroxypropyl; or 3-hydroxypropyl and n is 0–1.

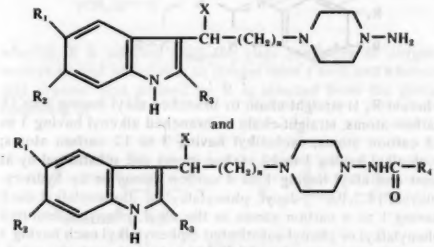
3,997,539
3-(4-ACYLAMINOPIPERAZIN-1-YL ALKYL)INDOLES, PRECURSORS AND PROCESSES FOR THE PREPARATION THEREOF

Edward J. Glamkowski, Warren, and Philip A. Reitano, Raritan, both of N.J., assignors to American Hoechst Corporation, Bridgewater, N.J.

Filed May 31, 1974, Ser. No. 475,315
Int. Cl.² C07D *295/04*
U.S. Cl. 260—268 BC 32 Claims



1. A compound selected from the group depicted by the formulae:



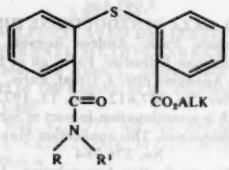
wherein X is a member selected from the group consisting of hydrogen and hydroxy; n is 0 or 1; R_1 and R_2 each is a member selected from the group consisting of hydrogen and alkoxy of 1–2 carbon atoms; R_3 is a member selected from the group consisting of hydrogen and alkyl of 1–3 carbon atoms; and R_4 is a member selected from the group consisting of alkyl of 1–4 carbon atoms, benzhydryl, cycloalkyl of 6 to 10 carbon atoms, bridged cycloalkyl of 6–10 carbon atoms, phenyl; mono, di, and tri substituted phenyl, wherein the substituents are selected from the group consisting of alkyl of 1 to 4 carbon atoms, alkoxy of 1 to 4 carbon atoms, halogen, trifluoromethyl, phenyl, sulfamyl, nitro and hydroxy; furyl; substituted furyl wherein the substituents are selected from the group consisting of halogen and lower alkyl; thienyl; pyrroyl; pyrazinyl; pyridyl; and a physiologically tolerable acid addition salt thereof.

3,997,540
O [(O-PIPERAZINOCARBONYL-PHENYL)-THIO]-BENZOATES

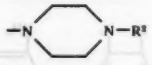
Nariman Bomanshaw Mehta, and Lawrence Edward Brieaddy, both of Raleigh, N.C., assignors to Burroughs Wellcome Co., Research Triangle Park, N.C.

Filed July 21, 1975, Ser. No. 597,697
Int. Cl.² C07D *295/18*
U.S. Cl. 260—268 C 4 Claims

1. The compound of the formula



where NRR¹ is



where R² is hydrogen or lower alkyl and ALK is alkyl of 1 to 4 carbon atoms.

3,997,541

LACTONES OF THE BENZAZAXANTHENE SERIES AND DYE-FORMING COMPONENTS FOR DUPLICATION PROCESSES

Ernst Schefczik, Ludwigshafen, and Hellmut Kast, Bobenheim-Roxheim, both of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany

Filed July 26, 1974, Ser. No. 492,039

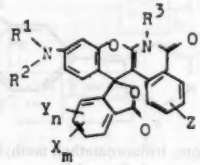
Claims priority, application Germany, Aug. 1, 1976, 2338954

Disclosure was also published under second Trial Voluntary Protest Program on Feb. 24, 1976

Int. Cl.² C07D *217/24*

U.S. Cl. 260—287 C 5 Claims

1. A lactone of the benzazaxanthene series of the formula:



in which

R¹ is hydrogen or alkyl of one to three carbon atoms;

R² is phenyl or phenyl bearing alkyl of one to three carbon atoms, chloro or bromo as a substituent;

R³ is hydrogen, phenyl, alkyl of one to six carbon atoms, phenyl-substituted alkyl of one to six atoms in the alkyl, phenyl bearing alkyl of one to three carbon atoms as a substituent, or phenyl bearing chloro as a substituent;

X is hydrogen, chloro, bromo or alkyl of one to three carbon atoms;

Y is hydrogen, chloro, bromo or alkyl of one to three carbon atoms;

Z is hydrogen, chloro, bromo, alkyl of one to four carbon atoms or phenyl;

m is the integer 1 to 2; and

n is the integer 1 to 2.

3,997,542

1-(HALOGENATED-ACETYL)-1,2,3,4-TETRAHYDRO-6-QUINOLINOLS AND ESTERS THEREOF

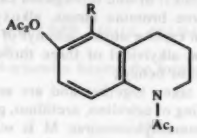
Denis Mahlon Bailey, East Greenbush, N.Y., assignor to Sterling Drug Inc., New York, N.Y.

Filed June 23, 1975, Ser. No. 589,195

Int. Cl.² C07D *215/08*

U.S. Cl. 260—287 T 11 Claims

1. A compound of the formula



where Ac_1 is haloacetyl, dihaloacetyl or trihaloacetyl with halo being chloro or bromo, R is hydrogen, chloro or bromo, and Ac_2 is hydrogen, Ac_1, alkanoyl having from one to sixteen carbon atoms, benzoyl, 2(or 3)-thenoyl, 2(or 3)-furoyl or N-(lower-alkyl)carbamoyl.

3,997,543

PROCESS FOR PREPARING QUINUCLIDINE ENANTIOMERS

Mordechai Sokolovsky, 13 Rabina St.; Moshe Rehavi, 16 Reading St., both of Ramat Aviv, and Saul Maayani, 7 Hahistadrut St., Givatayim, all of Israel

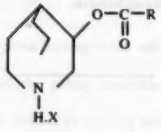
Filed Apr. 18, 1975, Ser. No. 569,282

Claims priority, application Israel, Apr. 24, 1974, 44707

Int. Cl.² C07D *211/42*

U.S. Cl. 260—293.53 2 Claims

1. In a process for the preparation of (+) enantiomers of the general formula



wherein R designates lower alkyl of up to and including 3 carbon atoms, and X designates a physiologically acceptable anion, the step which comprises esterifying racemic 3-quinuclidinol by conventional means so as to obtain racemic 3-lower alkanoyloxy quinuclidine, subjecting the thus obtained product to enzymatic hydrolysis by a suitable cholinesterase, so as to selectively hydrolyse the (−) isomer, separating the unchanged (+) 3-lower-alkanoyloxy quinuclidine, hydrolyzing the (+) 3-lower-alkanoyloxy quinuclidine to obtain (+)-3-quinuclidinol.

3,997,544

PLANT GROWTH REGULANT CARBAMOYLPHOSPHONATES

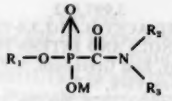
William P. Langsdorf, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 478,968, June 13, 1974, Pat. No. 3,952,074, which is a continuation-in-part of Ser. No. 85,221, Oct. 29, 1970, Pat. No. 3,819,353, which is a continuation-in-part of Ser. No. 803,962, March 3, 1969, abandoned, which is a continuation-in-part of Ser. No. 731,732, May 24, 1968, Pat. No. 3,627,507. This application Feb. 26, 1975, Ser. No. 553,423

Int. Cl.² C07D *401/12*

U.S. Cl. 260—293.64 5 Claims

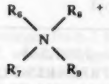
1. A compound of the formula:



wherein:

R_1 is alkyl of one through six carbon atoms, chloroalkyl of one through six carbon atoms having up to three chlorine atoms, bromoalkyl of one through six carbon atoms having up to three bromine atoms, alkoxy alkyl of three through seven carbon atoms, alkenyl of two through six carbon atoms, alkylvinyl of three through four carbon atoms, phenyl or benzyl;

R_2 and R_3 are taken together and are selected from the group consisting of aziridino, azetidino, pyrolidino, piperidino or hexamethyleneimino; M is selected from the group consisting of ammonium, hydrogen, sodium, lithium, potassium, calcium, magnesium, zinc, manganese, barium, or



where R_6, R_7, and R_8 can be the same or different and each can be hydrogen, alkyl of one through four carbon atoms, or hydroxy alkyl of two through four carbon atoms; and R_9 is hyrogen, alkyl of one through twelve carbon atoms, allyl, benzyl, amino, methylamino, or dimethylamino, R_6 and R_7 can be taken together to form a ring selected from the group consisting- of morpholino, aziridino, azetidino, pyrrolidino, piperidino or hexamethyleneimino, where R_8 and R_7 form a ring, R_8 and R_9 are hydrogen.

5. The compound of claim 1, piperidinium benzyl piperidinocarbonylphosphonate.

3,997,545

THIENOPYRIDINE-CARBOXYLIC ACID DERIVATIVES

Yutaka Kuwada, Ashiya; Kanji Meguro, Takarazuka; Yoshiaki Sato, Kobe, and Takeshi Fugono, Kawanishi, all of Japan, assignors to Takeda Chemical Industries, Ltd., Japan

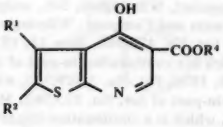
Division of Ser. No. 490,704, July 29, 1975, Pat. No. 3,951,989. This application Sept. 12, 1975, Ser. No. 612,743

Claims priority, application Japan, July 23, 1973, 48-82869; July 23, 1973, 48-82870; Nov. 16, 1973, 48-129352; Nov. 16, 1973, 48-129353

Int. Cl.² C07D *513/00*

U.S. Cl. 260—294.8 C 29 Claims

1. A compound of the formula



wherein R^1 represents hydrogen or lower alkyl; R^2 represents hydrogen, lower alkyl or halogen; and R^4 represents hydrogen or a lower alkyl; or their pharmaceutically acceptable salts obtainable when R^4 is hydrogen.

3,997,546

3-AMINO 2-AZA BENZOQUINONE DIIMINES

Gregoire Kalopissis, Paris; Andree Bugaut, Boulogne-sur-Seine, and Francoise Estradier, Paris, all of France, assignors to Societe Anonyme dite: L'Oreal, Paris, France

Division of Ser. No. 387,612, Aug. 13, 1973, Pat. No. 3,893,802, which is a continuation-in-part of Ser. No. 131,458, April 5, 1971, abandoned. This application May 12, 1975, Ser. No. 576,784

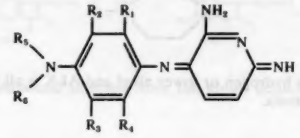
Claims priority, application Luxembourg, Apr. 10, 1970, 60702

Int. Cl.² C07D *213/74*

U.S. Cl. 260—295 S 6 Claims

1. An indamine selected from the group consisting of

a. an indamine having the formula



wherein R_1, R_2, R_3 and R_4 each independently are selected from the group consisting of hydrogen, halogen, lower alkyl having 1–4 carbon atoms and lower alkoxy having 1–4 carbon atoms, and R_5 and R_6 are both chosen from one of a member selected from the group consisting of hydrogen, lower alkyl having 1–4 carbon atoms and lower hydroxy alkyl having 1–4 carbon atoms,

b. a human hair compatible water soluble acid salt of said indamine in (a), and

c. a double chloride of zinc and said indamine in (a).

3,997,547

PHENYLIMINO-2H-QUINOLIZINES

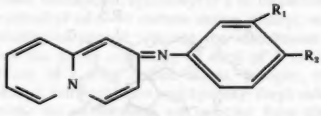
Robert J. Alaimo, Norwich, N.Y., assignor to Morton-Norwich Products, Inc., Norwich, N.Y.

Filed July 14, 1975, Ser. No. 595,333

Int. Cl.² C07D *455/02*

U.S. Cl. 260—296 B 7 Claims

1. A compound of the formula:



wherein R_1 is chloro, trifluoromethyl, methyl or hydrogen; R_2 is hydrogen, chloro, methyl or ethoxy.

3,997,548

HYDROXY-2,1-BENZISOTHIAZOLES

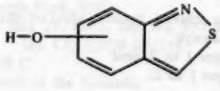
Gary M. Singerman, Prairie Village, Kans., assignor to Gulf Research & Development Company, Pittsburgh, Pa.

Division of Ser. No. 426,118, Dec. 19, 1973, Pat. No. 3,929,815. This application May 28, 1975, Ser. No. 581,635

Int. Cl.² C07D *275/04*

U.S. Cl. 260—304 A 5 Claims

1. A compound having the general formula



3,997,549
N-ARYLSULFENYLATED DERIVATIVES OF BENZOFURANYL METHYLCARBAMATES

Tetsuo Roy Fukuto, and Allan L. Black, both of Riverside, Calif., assignors to The Regents of the University of California, Berkeley, Calif.

Filed Mar. 12, 1973, Ser. No. 340,507
Int. Cl.² C07D 277/38, 317/10, 307/76
U.S. Cl. 260—306.6 A 3 Claims

1. The compound 2,3-dihydro-2,2-dimethyl-7-benzofuranyl (2-benzothiazolylthio) (methyl)carbamate.

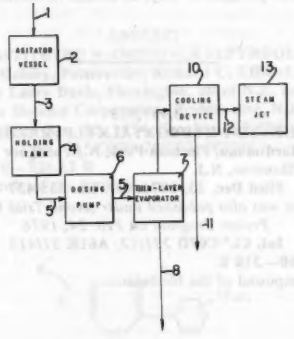
2. The compound 2,3-dihydro-2,2-dimethyl-7-benzofuranyl (methyl)-(3,4-methylenedioxyphenylthio)carbamate.

3. The compound 2,3-dihydro-2,2-dimethyl-7-benzofuranyl (4-cyanophenylthio) (methyl)carbamate.

3,997,550
METHOD FOR THE PURIFICATION OF 2-AMINOTHIAZOLE

Gerhard Künstle, Raitenhaslach; Klaus Vornehm; Hellmuth Spes, both of Burghausen, and Herbert Siegl, Haiming, all of Germany, assignors to Wacker-Chemie GmbH, Munich, Germany

Filed Apr. 10, 1975, Ser. No. 562,269
Claims priority, application Germany, Apr. 29, 1974, 2420748
Int. Cl.² C07D 277/40
U.S. Cl. 260—306.8 R 4 Claims



1. A process for the purification of crude 2-aminothiazole consisting essentially of the steps of subjecting an aqueous melt of 2-aminothiazole in from about 10% to 20% by weight of water to vacuum distillation in the presence of from 0.005% to 0.3% by weight of a borate ester of the formula

$$B(OR)_3$$

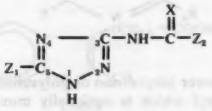
wherein R is a member selected from the group consisting of alkyl having from 1 to 5 carbon atoms, alkenyl having from 3 to 5 carbon atoms, and mixtures thereof, and from 0 to 0.05% by weight of triphenyl phosphine at a vacuum of from 0.5 to 6 Torr and a temperature of from 150° C to 200° C, cooling the volatiles produced to a temperature below the boiling temperature of 2-aminothiazole at the vacuum involved, and recovering said purified 2-aminothiazole.

3,997,551
3-SALICYLAMIDO-S-TRIAZOLES

Motonobu Minagawa, Koshigaya; Mitsuo Akutsu, and Kenichi Nakagawa, both of Tokyo, all of Japan, assignors to Argus Chemical Corporation, Brooklyn, N.Y.

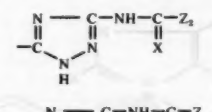
Division of Ser. No. 473,526, May 28, 1974, Pat. No. 3,963,982, which is a division of Ser. No. 211,647, Dec. 23, 1971, Pat. No. 3,849,370. This application Dec. 20, 1974, Ser. No. 534,988
Claims priority, application Japan, Dec. 30, 1970, 46-122270
Int. Cl.² C07D 249/10, 401/04
U.S. Cl. 260—308 R 6 Claims

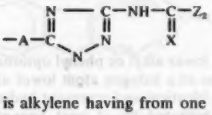
1. 3-Amido-1,2,4-triazoles having the formula:



wherein:

a. Z_1 is selected from the group consisting of hydrogen, alkyl having from one to 18 carbon atoms; alkylenealkoxy and alkylenearyloxy having from two to 18 carbon atoms; phenyl; pyridyl;





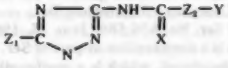
in which A is alkylene having from one to eight carbon atoms or vinylene;

b. X is selected from the group consisting of oxygen and sulfur;

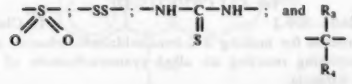
c. Z_2 is a benzene or naphthalene ring substituted by from one to two R_1 groups and from zero to two R_2 groups;

i. R_1 is selected from the group consisting of OH, SH and $SC_2H_4COOCH_3$; and

ii. R_2 is selected from the group consisting of alkyl, alkyl phenyl, alkoxy and alkyl phenoxy, each having from one to 18 carbon atoms; phenyl, phenoxy and halogen; and



where Y is selected from the group consisting of oxygen; sulfur;



R_3 and R_4 are selected from the group consisting of hydrogen and alkyl having from one to three carbon atoms, provided, that there are at most two 1,2,4-triazole groups in the molecule.

3,997,552
CHLORINATED IMIDAZOLE DERIVATIVES AND A PROCESS FOR PREPARING THEM

Karl Heinz Buchel, Wuppertal, Germany, assignor to Bayer Aktiengeseilschaft, Leverkusen, Germany

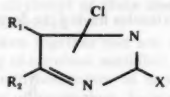
Filed Aug. 7, 1975, Ser. No. 602,948

Claims priority, application Germany, Aug. 31, 1974, 2441820

Int. Cl.² C07D *233/68*

U.S. Cl. 260—309 **10 Claims**

1. Imidazole derivative having the formula

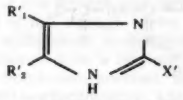


wherein

X is chlorine, lower alkyl mono or polysubstituted by chlorine, or phenyl which is optionally mono or polysubstituted by halogen and/or lower alkyl and

R_1 and R_2 are identical or different and are chlorine or phenyl optionally substituted by at least one of halogen lower alkyl.

6. Process for preparing imidazole derivatives of claim 1 which comprises converting an imidazole derivative having the formula



(IV)

wherein

X′ is hydrogen, lower alkyl or phenyl optionally substituted by at least one of a halogen atom lower alkyl and

R'_1 and R'_2 are identical and represent hydrogen or phenyl optionally substituted by at least one of halogen and lower alkyl

by means of hydrogen chloride, in the absence of water, into the corresponding hydrochloride, subsequently reacting said hydrochloride with an excess of chlorine at elevated temperature.

3,997,553
2-BENZIMIDAZOLECARBAMIC ACID ESTERS BY THE CYANAMIDE PROCESS

Rudolph Schlatter, Chadds Ford, Pa., and Charles DeWitt Adams, Wilmington, Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation of Ser. No. 836,580, June 25, 1969, Pat. No. 3,905,991, which is a continuation-in-part of Ser. No. 745,403, July 17, 1968, abandoned, which is a continuation-in-part of Ser. No. 674,739, Oct. 12, 1967, abandoned, which is a continuation-in-part of Ser. No. 594,384, Nov. 15, 1966, abandoned. This application Jan. 15, 1975, Ser. No. 541,241

The portion of the term of this patent subsequent to Sept. 16, 1992, has been disclaimed.

Int. Cl.² C07D *235/32*

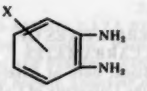
U.S. Cl. 260—309.2 **14 Claims**

1. A process for making a 2-benzimidazolecarbamic acid ester comprising reacting an alkyl cyanocarbamate of the following formula:

$HN(CN)CO_2R$

where

R is alkyl of 1 through 4 carbon atoms; with an o-phenylenediamine of the following formula:



where

X is hydrogen, halogen, nitro or alkyl of 1 through 4 carbon atoms; in the presence of water and sufficient acid to maintain a pH of from 2.5 to 5, until the precipitation of the 2-benzimidazolecarbamic acid ester is complete, and recovering said 2-benzimidazolecarbamic acid ester from the reaction mixture.

3,997,554
N,N-DI(CARBONYL CHLORIDES) OF N,N′-ALKYLENE UREAS

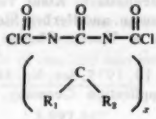
Michael J. Van Eyck, Midland, Mich., and Laurence I. Peterson, Doylestown, Pa., assignors to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 555,464, March 5, 1975, abandoned. This application Aug. 25, 1975, Ser. No. 607,404

Int. Cl.² C07D *233/38*

U.S. Cl. 260—309.7 **4 Claims**

1. A compound represented by the formula



wherein x is 2, 3 or 4 and R_1 and R_2 are independently, each occurrence, hydrogen or alkyl of from 1 to about 3 carbon atoms.

3,997,555
4-PHENYL-1-HYDROXYALKYLPYRAZOLES

Goetz E. Hardtmann, Florham Park, N.J., assignor to Sandoz, Inc., E. Hanover, N.J.

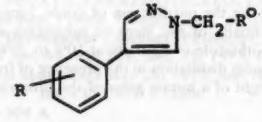
Filed Dec. 23, 1974, Ser. No. 535,437

Disclosure was also published under second Trial Voluntary Protest Program on Feb. 24, 1976

Int. Cl.² C07D *231/12*; A61K *31/415*

U.S. Cl. 260—310 R **10 Claims**

1. A compound of the formula:



wherein

R^o is hydroxyalkyl of 1 to 5 carbon atoms, and

R is hydrogen, fluoro, chloro, bromo, alkyl of 1 to 4 carbon atoms, alkoxy of 1 to 4 carbon atoms or trifluoromethyl,

or a pharmaceutically acceptable acid addition salt thereof.

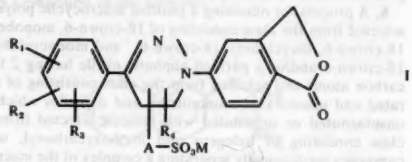
3,997,556

1,3-DIPHENYL PYRAZOLINES

Ivan Joseph Bolton, Bingley, and Alec Victor Mercer, Leeds, both of England, assignors to Sandoz Ltd., Basel, Switzerland

Filed Aug. 4, 1975, Ser. No. 601,279
Claims priority, application United Kingdom, Aug. 9, 1974, 35129/74; Feb. 10, 1975, 5523/75; May 12, 1975, 19781/75
Int. Cl.² C07D 407/10, 231/06
U.S. Cl. 260—310 D 10 Claims

1. A compound of formula I,



I

in which R_1, R_2 and R_3, independently, are hydrogen, chlorine, fluorine, C_{1-4}alkyl or C_{1-4}alkoxy,
R_4 is hydrogen, C_{1-4}alkyl or phenyl,
A is a straight C_{1-3}alkylene chain, unsubstituted or substituted by methyl,
and M is a hydrogen atom or a non-chromophoric cation.

4. A compound of claim 1 wherein M is hydrogen or an alkali metal cation, an alkaline earth metal cation or an ammonium cation of the formula $R_{10}R_{11}R_{12}N^+H$ wherein R_{10}, R_{11} and R_{12}, independently, are hydrogen or C_{1-4}alkyl unsubstituted or substituted by one or two hydroxy radicals.

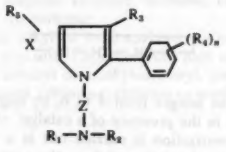
3,997,557

SUBSTITUTED N-AMINOALKYLPYRROLES

Grover C. Helsley, Pottersville; Richard C. Effland, Somerville, and Larry Davis, Flemington, all of N.J., assignors to American Hoechst Corporation, Bridgewater, N.J.

Filed Apr. 23, 1974, Ser. No. 463,374
Int. Cl.² C07D 209/02, 209/04
U.S. Cl. 260—326.12 R 14 Claims

1. A pyrrole of the formula



wherein Z is a straight or branched saturated hydrocarbon chain of from 2 to 5 carbon atoms; R_1 is hydrogen or alkyl of from 1 to 3 carbon atoms; R_2 is alkyl of from 1 to 3 carbon atoms or phenyl; R_3 is hydrogen, or phenyl; R_4 is alkyl of from 1 to 6 carbon atoms, alkoxy of from 1 to 4 carbon atoms, halogen, trifluoromethyl, hydroxy, nitro, cyano, amino, acetamido or phenyl; n is an integer from 0 to 3, inclusive; X is polymethylene of from 3 to 7 carbon atoms; and R_5 is hydrogen, alkyl of from 1 to 5 carbon atoms, alkoxy of from 1 to 2 carbon atoms or halogen; or a physiological tolerable acid addition salt thereof.

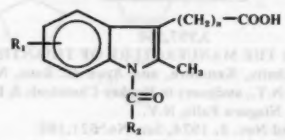
3,997,558

PROCESS OF PRODUCING 1-ACYL-2-METHYL-INDOLYL-3-ALKANOIC ACIDS

Werner J. Frantsits, Boltzmanngasse 9a-11, Vienna 9, Austria

Filed July 24, 1975, Ser. No. 598,835
Claims priority, application Austria, Dec. 18, 1974, 10094/74
Int. Cl.² C07D 209/26, 209/28
U.S. Cl. 260—326.13 A 9 Claims

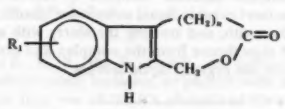
1. A process of producing 1-acyl-2-methyl-indolyl-3-alkanoic acids having the general formula



(II)

wherein R_1 represents hydrogen, halogen, an alkoxy group or an aryloxy group, n is 1, 2 or 3, and R_2 represents an aromatic group, in which

a lactone having the general formula

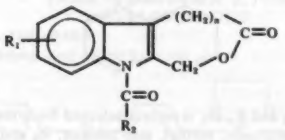


(I)

wherein R_1 and n have the meanings stated above, is acylated by being reacted in a polar solvent in the presence of sodium hydride with an acid derivative having the general formula

(III)

wherein R_2 has the meaning stated above and X represents a halogen, to form a compound having a lactone ring and having the general formula



(II')

wherein R_1, R_2, and n have the meanings stated above, and the last-mentioned compound is hydrogenolyzed in the presence of a hydrogenation catalyst to open the lactone ring.

3,997,559

N-ACETYL-L-HYDROXY-PROLINE ZINC SALT

Paul Coirre, Magnard a Paris; Bertrand Coirre, Ville d'Avray; Jean-Claude Denis, Paris; Jerome Rambaud, Paris, and Jean Cahn, Paris, all of France, assignors to Franco Chimie S.a.r.l., Paris, France

Division of Ser. No. 414,294, Nov. 9, 1973, Pat. No. 3,932,638, which is a continuation-in-part of Ser. No. 243,397, April 12, 1972, Pat. No. 3,891,765, which is a continuation-in-part of Ser. No. 81,499, Oct. 16, 1970, abandoned, which is a continuation-in-part of Ser. No. 756,410, Aug. 30, 1968, abandoned. This application Dec. 24, 1975, Ser. No. 644,026

Int. Cl.² C07D *207/16*

U.S. Cl. 260—326.22 1 Claim

1. N-acetyl-L-hydroxyproline zinc salt (2:1).

3,997,560

PROCESS FOR THE MANUFACTURE OF THIANTHRENE

Harry E. Buckholtz, Kenmore, and Arun C. Bose, Niagara Falls, both of N.Y., assignors to Hooker Chemicals & Plastics Corporation, Niagara Falls, N.Y.

Filed Nov. 5, 1974, Ser. No. 521,108

Int. Cl.² C07D *339/08*

U.S. Cl. 260—327 P 16 Claims

1. A process for the manufacture of thianthrene which comprises adding sulfur monochloride to benzene in the presence of aluminum chloride in a molar ratio of benzene:sulfur monochloride of greater than about 5.0:1.0 and reacting at a temperature of about 60° to about 80° Celsius to yield a crude insoluble thianthrene product in the form of a thianthrene-aluminum chloride complex; separating the complex from the reaction medium; and separating thianthrene from the thianthrene-aluminum chloride complex by admixing the complex with an inert organic liquid solvent for thianthrene to form a slurry therewith, and treating the slurry with a Lewis base to free the thianthrene from the complex and dissolving the thianthrene in the organic liquid solvent.

3,997,561

PRESSURE SENSITIVE COPYING PAPER

Hiromitsu Seki, and Kenji Yamamoto, both of Oosaka, Japan, assignors to Yamamoto Kagaku Gosei Kabushiki Kaisha, Japan

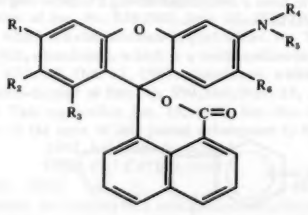
Filed Dec. 15, 1971, Ser. No. 208,415

Claims priority, application Japan, Dec. 15, 1970, 45-112053

Int. Cl.² C07D *493/10*

U.S. Cl. 260—335 7 Claims

1. A fluoran compound represented by the following general formula:



wherein R_1, R_2 and R_3 are members selected from the group consisting of hydrogen, methyl, and halogen; R_4 and R_5 are members selected from the group consisting of hydrogen, methyl, and ethyl; and R_6 is a member selected from the group consisting of hydrogen, methyl, amino and acetylamino; but R_2 and R_3 may cooperate to form a phenyl nucleus.

3,997,562

MACROCYCLIC POLYETHER/NITRILE COMPLEXES

Charles Leonard Liotta, Decatur, Ga., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Oct. 1, 1974, Ser. No. 511,000

Int. Cl.² C07D *323/00*

U.S. Cl. 260—338 11 Claims

1. A complex of a macrocyclic polyether selected from the class consisting of 18-crown-6, monobenzo-18-crown-6, dicyclohexyl-18-crown-6, and monocyclohexyl-18-crown-6 and an aliphatic nitrile having 2 to 12 carbon atoms and selected from the class consisting of saturated and unsaturated mononitriles and dinitriles which are unsubstituted or substituted with radicals selected from the class consisting of halogens and methoxycarbonyl.

6. A process for obtaining a purified macrocyclic polyether selected from the class consisting of 18-crown-6, monobenzo-18-crown-6, dicyclohexy-18-crown-6, and monocyclohexyl-18-crown-6 and/or a purified aliphatic nitrile having 2 to 12 carbon atoms and selected from the class consisting of saturated and unsaturated mononitriles and dinitriles which are unsubstituted or substituted with radicals selected from the class consisting of halogens and methoxycarbonyl, which comprises mechanically separating a complex of the macrocyclic polyether and the nitrile from a mixture containing the complex, dissociating the complex and separating the components from each other.

3,997,563

PROCESS FOR SELECTIVE PREPARATION OF MACROCYCLIC POLYETHERS

Johannes Dale, Bloomenholm, and Kari Daasvatn, Saetre, both of Norway, assignors to Johannes Dale, Norway

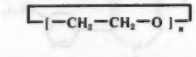
Filed May 27, 1975, Ser. No. 580,794

Claims priority, application Norway, May 28, 1974, 1930/74

Int. Cl.² C07D *323/00*

U.S. Cl. 260—338 6 Claims

1. Process for preparing cyclic polyethers of the general formula



in which n is an integer from 4 to 6, by oligomerization of ethylene oxide in the presence of a catalyst, characterized in that the oligomerization is carried out in a solvent in the presence of a catalyst selected from the group consisting of boron trifluoride, phosphorus pentafluoride and antimony pentafluoride, and in the absence of compounds which can provide potential terminal groups which will lead to the formation of linear polymers, and that the oligomerization is carried out in the presence of salts selected from the group consisting of fluoborate, fluophosphate and fluoantimonate salts of alkali metals, alkaline earth metals and transition metals selected from the group consisting of Ag, Hg, Ni, Cu and Zn, to form complexes between the polyethers formed and said salts, separating the complexes from the reaction mixture and liberating the polyethers from the complexes.

3,997,564

N-(3,4-METHYLENEDIOXY-PHENYL)UREAS

George A. Cooke, Denville, and William J. Houlihan, Mountain Lakes, both of N.J., assignors to Sandoz, Inc., E. Hanover, N.J.

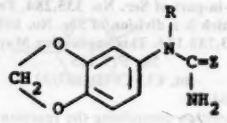
Division of Ser. No. 351,093, April 13, 1973, Pat. No. 3,856,960, which is a division of Ser. No. 141,010, May 6, 1971, Pat. No. 3,748,331, which is a continuation-in-part of Ser. No. 34,902, May 5, 1970, abandoned, which is a continuation-in-part of Ser. No. 881,325, Dec. 1, 1969, abandoned. This application Sept. 11, 1974, Ser. No. 504,877

Disclosure was also published under second Trial Voluntary Protest Program on Feb. 24, 1976

Int. Cl.[2] C07D *317/68*

U.S. Cl. 260—340.5 4 Claims

1. A compound of the formula:



wherein

R is alkyl of 1 to 5 carbon atoms, cycloalkyl of 3 to 6 carbon atoms or cycloalkylalkyl of 4 to 7 total carbon atoms in which the cycloalkyl is of 3 to 6 carbon atoms and the alkyl is straight chain alkyl of 1 to 3 carbon atoms, and

Z is oxygen or sulfur.

3,997,565

ACYLCROWNETHER OXIMES AND OXIME ETHERS

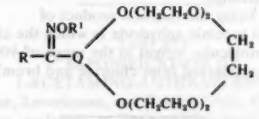
James Charles Kauer, Kennett Square, Pa., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Sept. 19, 1975, Ser. No. 615,185

Int. Cl.[2] C07D *323/00*

U.S. Cl. 260—340.3 20 Claims

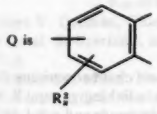
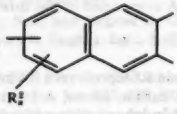
1. A compound of the formula



wherein

R is hydrogen, alkyl of 1–10 carbons, aryl of 6–10 carbons, aralkyl of 7–10 carbons, pyridyl, pyrazyl, thienyl, furyl and dioxolyl, and such groups containing up to two substituents of fluorine, chlorine, bromine, nitro, amino or alkoxy of 1–10 carbons;

R^1 is hydrogen, alkyl of 1–10 carbons, aminoalkyl of 1–7 carbons, or acyl of 1–10 carbons in which acyl is alkylcarbonyl, arylcarbonyl or aralkylcarbonyl, and such groups containing up to 2 fluorine, chlorine or methoxyl substituents;

Q is  or 

in which

R^2 is hydrogen, fluorine, chlorine, bromine, nitro, amino or alkyl of 1–10 carbons; and

$n = 0$ to 2.

3,997,566

TRICYCLIC PROSTAGLANDIN

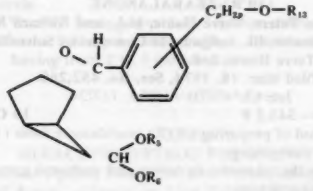
Douglas R. Morton, Jr., Portage, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Continuation-in-part of Ser. No. 552,707, Feb. 24, 1975, abandoned, which is a continuation-in-part of Ser. No. 488,295, July 12, 1974, abandoned. This application Aug. 13, 1975, Ser. No. 604,159

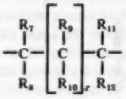
Int. Cl.[2] C07D *319/06*

U.S. Cl. 260—340.7 6 Claims

1. An optically active compound of the formula



or a racemic mixture of that compound and the enantiomer thereof, wherein C_pH_{2p} represents a valence bond or alkylene of one to 4 carbon atoms, inclusive, with one or 2 carbon atoms in the chain between the phenylene ring and —O—; wherein R_5 and R_6 are the group represented by the formula



wherein R_7, R_8, R_9, R_{10}, R_{11}, and R_{12} are hydrogen, alkyl of one to 4 carbon atoms, inclusive, or phenyl, with the proviso that not more than one of the R's phenyl and the total number of carbon atoms is from 2 to 10, inclusive; and x is zero or one; wherein R_{13} is carboxyacyl of the formula

wherein R_{14} is hydrogen, alkyl of one to 19 carbon atoms, inclusive, or aralkyl of 7 to 12 carbon atoms, inclusive, wherein alkyl or aralkyl are substituted with zero to 3 halo atoms; and wherein ~ indicates attachment to the cyclopropane ring in endo or exo configuration.

3,997,567

SUBSTITUTED 2-(4-PHENOXYPHENYL)-2-TERTIARY BUTYL-1,3-DIOXALANES

Faizulla G. Kathawala, West Orange, N.J., assignor to Sandoz, Inc., E. Hanover, N.J.

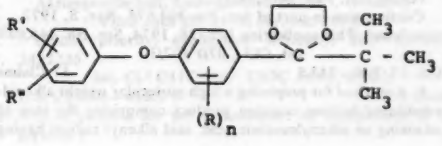
Filed Nov. 7, 1974, Ser. No. 521,643

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 2, 1976

Int. Cl.[2] C07D *317/22*

U.S. Cl. 260—340.9 4 Claims

1. A compound of the formula:



wherein

R is hydrogen, alkyl of 1 to 4 carbon atoms, or halo of atomic weight of from 18 to 36,

R′ and R″ are independently hydrogen, halo of atomic weight of from 18 to 36, alkyl of 1 to 4 carbon atoms or alkoxy of 1 to 4 carbon atoms, and

n is 1 or 2.

3,997,568
CONVERSION OF (10′S)-ZEARALENONE TO (10′R)-ZEARALANONE

Charles Allan Peters, Terre Haute, Ind., and Richard Nelson Hurd, Wilmette, Ill., assignors to Commercial Solvents Corporation, Terre Haute, Ind.

Filed Mar. 18, 1974, Ser. No. 452,260
Int. Cl.² C07D *313/00, 317/24*
U.S. Cl. 260—343.2 F **10 Claims**

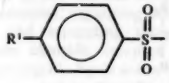
1. A method of preparing (10′R)-zearalanone from (10′S)-zearalenone comprising:

protecting the phenolic hydroxy and carbonyl groups of (10′S)-zearalenone;

cleaving the lactone linkage in the protected (10′S)-zearalenone in an alkaline medium to provide a hydroxy acid;

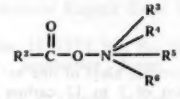
esterifying the hydroxy acid to provide a hydroxy ester;

treating the hydroxy ester with methane sulfonyl chloride or an anhydride or chloride of a phenyl sulfonyl of the formula



wherein R^1 is hydrogen, lower alkyl, or bromine to provide a sulfonic ester;

inverting the structure of the sulfonic ester from (S) to (R) by reacting the sulfonic ester with a tetraalkylammonium carboxylic ester of the formula



wherein each of R^2, R^3, R^4, R^5 and R^6 is lower alkyl, and thereby providing a carboxylic ester;

hydrolyzing the carboxylic ester in an alkaline medium to provide a hydroxy acid having the inverted structure;

lactonizing the hydroxy acid having the inverted structure; and

hydrogenolyzing the lactone in the presence of a catalytically effective amount of hydrogenation catalyst to provide (10′R)-zearalanone.

3,997,569
METHOD FOR PREPARING A LACTONE REACTION PRODUCT

Justin Christopher Powell, Wappingers Falls, N.Y., assignor to Texaco Inc., New York, N.Y.

Continuation-in-part of Ser. No. 304,675, Nov. 8, 1972, abandoned. This application Feb. 28, 1974, Ser. No. 446,844
Int. Cl.² C07D *307/32*
U.S. Cl. 260—343.5 **17 Claims**

1. A method for preparing a high molecular weight alkenyl-substituted lactone reaction product comprising the step of admixing an alkenylsuccinic acid, said alkenyl radical having an average molecular weight ranging from about 300 to 3,000 with a protonating agent or electron pair acceptor selected from the group consisting of sulfuric acid, perchloric acid, p-toluene sulfonic acid, boron trifluoride etherate and sulfonic acid ion exchange resins to form a substantially anhydrous reaction mixture and reacting said mixture under substantially anhydrous reaction conditions at an elevated temperature up to about 100° C until infrared spectra at about 5.66 and 5.74 micrometers indicates a substantial conversion of said alkenylsuccinic acid to said lactone reaction product.

3,997,570
ALKENYL HALOLACTONE ESTERS

Brian R. Kennedy, San Rafael, and Warren Lowe, El Cerrito, both of Calif., assignors to Chevron Research Company, San Francisco, Calif.

Continuation-in-part of Ser. No. 335,284, Feb. 23, 1973, abandoned, which is a division of Ser. No. 169,544, Aug. 5, 1971, Pat. No. 3,755,173. This application May 19, 1975, Ser. No. 579,125
Int. Cl.² C07D *307/32*
U.S. Cl. 260—343.6 **15 Claims**

1. The composition comprising the reaction product of

A. a monool or polyol or mixtures thereof wherein the monool is an unsubstituted C_1–C_{40} aliphatic or C_6–C_{40} alicyclic alcohol or phenol optionally alkylated with one or two alkyl groups of from one to one hundred carbon atoms and the polyol is selected from ethylene glycol, poly (C_{2-6} alkylene) glycol, glycerol, monooleate of glycerol, monosterate of glycerol, monomethyl ether of glycerol, pentaerythritol, 9,10-dihydroxy stearic acid, methyl ester of 9,10-dihydroxy stearic acid, 1,2-butanediol, 2,3-hexanediol, 2,4-hexanediol, pinacol, erythritol, arabitol, sorbitol, mannitol, 1,2-cyclohexan diol, xylene glycol, glucose, fructose, sucrose, rhamnose, mannose, glyceraldehyde, and galactose and

B. an alkenyl halolactone alkyl ester or acid; said ester being the reaction product of

1. alkenyl succinic anhydride in which the alkenyl group has a molecular weight in the range of 400–3000,

2. halogen selected from chlorine and bromine, and

3. C–C_3 alkanol;

and said acid being the reaction product of

1. alkenyl succinic anhydride in which the alkenyl group has a molecular weight in the range of 400-14 3000

2. halogen selected from chlorine and bromine, and

3. water.

3,997,571
COMPOUNDS CONTAINING FLUOROCARBON RESIDUES AND AZIDO GROUPS AS TEXTILE-FINISHING AGENTS

John Buckley; Richard Budziarek; Andrew John Nicholas, and Edward Jervis Vickers, all of Manchester, England, assignors to Imperial Chemical Industries Limited, London, England

Filed Sept. 3, 1974, Ser. No. 502,881
Claims priority, application United Kingdom, Sept. 10, 1973, 42426/73; Sept. 10, 1973, 42428/73
Int. Cl.² C07C *117/00*
U.S. Cl. 260—349 **3 Claims**

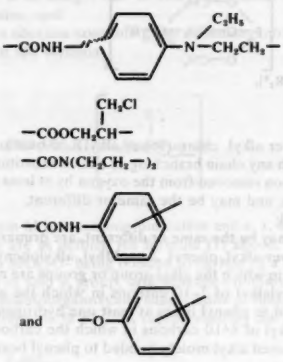
1. A compound of the formula

$$(Rf)-A-(X)_n$$

wherein Rf represents a fluorocarbon chain containing from 6 to 12 carbon atoms, A represents a linking group, X represents a sulphonazide or azidoformate group and *n* is 1 or 2, the linking group A being selected from the group consisting of

$-COOCH_2CH_2-$

$-COOCH_2CH_2OCH_2CH_2-$



3,997,572

N-[2-(NITRO-1-IMIDAZOLYL)ETHYL]NAPHTHAL IMIDES

John W. Cusic, Skokie, and Ernest F. Levon, Evanston, both of Ill., assignors to G. D. Searle & Co., Chicago, Ill.

Continuation-in-part of Ser. No. 383,911, July 30, 1973, Pat. No. 3,917,636, which is a continuation-in-part of Ser. No. 110,665, Jan. 28, 1971, Pat. No. 3,770,763, which is a continuation-in-part of Ser. No. 796,225, Feb. 3, 1969, Pat. No. 3,642,836. This application Aug. 4, 1975, Ser. No. 601,375

Int. Cl.² C07D *401/06*

U.S. Cl. 260—281 NH 1 Claim

1. A compound which is N-[2-(2-methyl-5-nitro-1-imidazolyl)ethyl]naphthalimide.

3,997,573

SAPONIFICATION OF 1-ACETAMINO-ANTHRAQUINONE

Horst Jager, Leverkusen, and Erich Klauke, Odenthal, both of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Mar. 18, 1976, Ser. No. 668,164

Claims priority, application Germany, Mar. 26, 1975, 2513254

Int. Cl.² C09B *1/16*; C07C *97/12, 97/24*

U.S. Cl. 260—378 12 Claims

1. In the saponification of 1-acetamino-anthraquinone to produce 1-amino-anthraquinone, the improvement which comprises effecting the saponification with aqueous alkali.

3,997,574

9-α-METHYL-STEROIDS

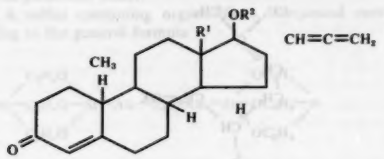
Robert V. Coombs, Chatham, N.J., and Eugene E. Galantay, Liestal, Switzerland, assignors to Sandoz, Inc., E. Hanover, N.J.

Continuation of Ser. No. 358,379, May 8, 1973, abandoned, which is a continuation-in-part of Ser. No. 237,498, March 23, 1972, abandoned, which is a continuation-in-part of Ser. No. 109,612, Jan. 25, 1971, abandoned. This application Sept. 5, 1974, Ser. No. 503,276

Int. Cl.³ C07J *5/00*

U.S. Cl. 260—397.45 15 Claims

1. A compound of the formula



wherein

R^1 is alkyl having from 1 to 3 carbon atoms; and

R^2 is a hydrogen atom, methyl, acetoacetyl or alkanoyl having from 2 to 4 carbon atoms.

3,997,575

BLEACHING METHOD FOR SULFONIC ACID

Toshiaki Ogoshi, Funabashi, and Yukio Kusumi, Chiba, both of Japan, assignors to Lion Fat & Oil Co., Ltd., Tokyo, Japan

Filed Nov. 4, 1974, Ser. No. 520,436

Claims priority, application Japan, Nov. 12, 1973, 48-126235

Int. Cl.² C07C *139/14*

U.S. Cl. 260—400 8 Claims

1. A method for bleaching sulfofatty acid material selected from the group consisting of sulfofatty acids having from 6 to 20 carbon atoms and esters thereof, which consists essentially of the steps of: mixing with said sulfofatty acid material from 0.5 to 20 percent by weight of a primary or secondary aliphatic alcohol having one to 12 carbon atoms, from 0.5 to 10 percent by weight of a peroxide bleaching agent, and from 0.1 to 10 percent by weight of water, all percentages being based on the weight of said sulfofatty acid material, and maintaining the mixture at 40° to 90° C for a period of time effective to bleach said sulfofatty acid material.

3,997,576

METHOD FOR PREPARATION OF α-SULFOFATTY ACID ESTER

Toshiaki Oghoshi, Funabashi, and Yukio Kusumi, Chiba, both of Japan, assignors to Lion Fat & Oil Co., Ltd., Tokyo, Japan

Filed Apr. 17, 1975, Ser. No. 568,851

Claims priority, application Japan, Apr. 22, 1974, 49-44456

Int. Cl.² C07C *143/90*

U.S. Cl. 260—410.9 R 6 Claims

1. A method of preparing an α-sulfofatty acid ester, which comprises the process of making a saturated fatty acid having 8 to 20 carbon atoms react with a gaseous mixture of an inert gas and SO_3 containing 1.2 to 4 moles of sulfur trioxide per mole of said saturated fatty acid in the presence of 1 to 2.2 moles of an aliphatic alcohol having 1 to 4 carbon atoms per mole of said saturated fatty acid.

3,997,577

MANUFACTURE OF LAVANDULOL AND ITS ESTERS

Karl von Fraunberg, Bobenheim, Germany, assignor to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany

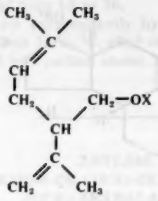
Filed June 20, 1975, Ser. No. 588,857

Claims priority, application Germany, July 5, 1974, 2432235

Int. Cl.² C11C *3/02*; C07C *35/00, 69/02*

U.S. Cl. 260—410.9 N 12 Claims

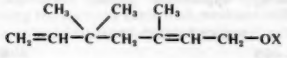
1. A process for the manufacture of compounds of the formula I



(I)

in which X is H or -CO-R, wherein R is H, HOOC-CH_2-CH_2-, a saturated or olefinically unsaturated aliphatic hydrocarbon radical of up to 8 carbon atoms, a saturated or olefinically unsaturated cycloaliphatic hydrocarbon radical of up to 8 carbon atoms or an aromatic hydrocarbon radical of 6 to 8 carbon atoms, each of which radicals may bear as substituents -OH, methoxy or acetyl groups in which process

A. the compound 3,5,5-trimethyl-hepta-1,6-dien-3-ol is converted to a 3,5,5-trimethyl-hepta-2,6-diene derivative of the formula II



(II)

in which X has the above meanings, and

B. the resulting compound of the formula II is heated, optionally in a solvent which is inert under the reaction conditions, at 150° to 250° C.

3,997,578

OXIDATION OF ALCOHOLS TO CARBOXYLIC ACIDS WITH RUTHENIUM CATALYSTS AND PERACID OXIDIZING AGENTS

Ming Nan Sheng, Cherry Hill, N.J., assignor to Atlantic Richfield Company, Los Angeles, Pa.

Continuation of Ser. No. 305,201, Nov. 9, 1972, abandoned. This application May 12, 1975, Ser. No. 576,414

Int. Cl.[2] C07C *51/26, 51/28, 51/24*

U.S. Cl. 260—413 **7 Claims**

1. A process for the production of fatty carboxylic acids which consists essentially of contacting primary aliphatic alcohols with a percarboxylic acid oxidizing agent, said percarboxylic acid providing between 0.9 mole and 3.2 mole equivalents of oxygen per mole of alcohol, in the presence of a ruthenium-containing catalyst selected from the group consisting of ruthenium metal, inorganic ruthenium salts and organic ruthenium salts and an inert solvent selected from the group consisting of hexane, heptane, chloroform and carbon tetrachloride said process being carried out at the reflux temperature of said solvent and recovering carboxylic acids from the reaction mixture.

3. A process in accordance with claim 1 wherein a base of an alkali metal salt of a fatty acid is added to the reaction mixture.

3,997,579

SELECTED PHOSPHORUS COMPLEXES OF ZEROVALENT IRON

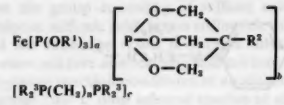
James Peter Jesson, Chadds Ford, Pa., and Chadwick Alma Tolman, Wilmington, Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Oct. 15, 1975, Ser. No. 622,674

Int. Cl.[2] C07F *15/02*

U.S. Cl. 260—439 R **12 Claims**

1. A compound of the formula



wherein:

the R^1's are lower alkyl, chloro(lower alkyl), or oxa(lower alkyl) in which any chain branching or chloro substitution occurs at carbon removed from the oxygen by at least two other carbons, and may be the same or different;

R^2 is lower alkyl;

the R^3's which may be the same or different, are primary or secondary lower alkyl, phenyl, 2-naphthyl, alkylphenyl of 7–10 carbons in which the alkyl group or groups are meta or para, phenylalkyl of 7–10 carbons in which the alkyl carbon bonded to phenyl bears at least one hydrogen, or alkylphenylalkyl of 8–10 carbons in which the carbon of the second-named alkyl moiety bonded to phenyl bears at least one hydrogen;

n is 1, 2, or 3;

a is 0–5;

b is 0–5;

c is 0, 1, or 2; and

$a + b + 2c = 5$.

3,997,580

SILICONE SULFATES

Edward L. Morehouse, New City, N.Y., assignor to Union Carbide Corporation, New York, N.Y.

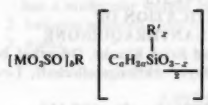
Division of Ser. No. 26,130, April 6, 1970, Pat. No. 3,707,492, which is a division of Ser. No. 574,576, Aug. 24, 1966, abandoned, which is a continuation-in-part of Ser. No. 304,988, Aug. 27, 1963, Pat. No. 3,381,019. This application Nov. 14, 1972, Ser. No. 306,294

Int. Cl. C07f *7/10*

U.S. Cl. 260—448.2 N **17 Claims**

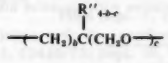
1. A siloxane selected from the group consisting of:

A. A siloxane containing the sulfatoorganoxyalkylsiloxy unit of the formula:

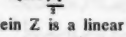


(I)

wherein M is an alkali metal cation, a is an integer of 2 to 4, x is an integer of 0 to 2, b and c are as hereinafter defined, R′ is a linear alkyl group having no more than 18 carbon atoms, R is a trivalent group having the formula:



wherein R″ is a linear alkyl group having no more than 19 carbon atoms, *b* is an integer of 1 to 3, *c* is an integer of 1 to 3 and *b*+*c* is an integer of 3 and is equal to the valence of said R group; each said sulfate group MO_3SO- being bonded to carbon of a carbon to carbon chain of said R group, said siloxane containing 1 to 100 mole % of sulfatoorganoxyalkylsiloxy units of said formula (I) and 0 to 99 mole % of units represented by the formula:



(II)

wherein Z is a linear alkyl group having no more than 18 carbon atoms, hydrogen, or a monovalent polyoxyalkylene

group of the formula $DO(C_sH_{2s}O)_yC_aH_{2a}$- wherein D is an alkyl group, y is an integer of 2 to 4, a is an integer of 2 to 3 and s ix an integer of 1 to 100, and z has a value from 0 to 3 inclusive; and

B. a siloxane containing the sulfatoorganoxyalkylsiloxy unit of the formula:

(III)

wherein M is an ammonium cation and a, x, b, c, R', R, R'' and $(b+c)$ are as defined for formula (I) above, each said sulfate group MO_3SO- being bonded to carbon of a carbon to carbon chain of said R group, said siloxane containing 1 to 100 mole % of sulfatoorganoxyalkylsiloxy units of said formula (III) and 0 to 99 mole % of units represented by the formula:

(IV)

wherein Z is a linear alkyl group or hydrogen and z has a value from 0 to 3 inclusive.

3,997,581

PROCESS FOR THE PRODUCTION OF SULFUR CONTAINING ORGANOSILICON COMPOUNDS

Hans-Dieter Pletka, Hanau, and Rudolf Michel, Freigericht, both of Germany, assignors to Deutsche Gold- und Silber-Scheideanstalt vormals Roessler, Frankfurt, Germany

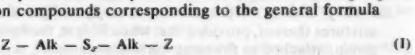
Filed Jan. 31, 1975, Ser. No. 546,084

Claims priority, application Germany, Feb. 4, 1974, 2405758

Int. Cl.² C07F 7/10, 7/18

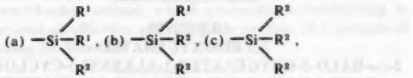
U.S. Cl. 260—448.8 R **14 Claims**

1. A process for the production of sulfur containing organo silicon compounds corresponding to the general formula

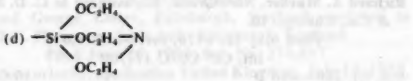


(I)

in which Z represents the group



or



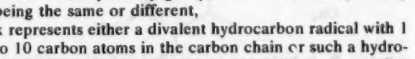
in which

R^1 is an alkyl group containing 1 to 4 carbon atoms, a cycloalkyl radical with 5 to 8 carbon atoms or the phenyl radical, and

R^2 represents an alkoxy group with a linear or branched carbon chain with 1 to 8 carbon atoms, the methoxyethoxy group, a cycloalkoxy group with 5 to 8 carbon atoms or the phenoxy group, each R^1 andR^2 optionally being the same or different,

Alk represents either a divalent hydrocarbon radical with 1 to 10 carbon atoms in the carbon chain or such a hydrocarbon radical interrupted once or twice by —O—, —S— or —NH—,

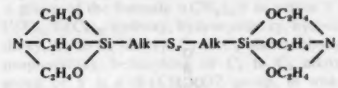
x is a number from 2.0 to 6.0, comprising reacting a compound corresponding to the general formula



(I)

with elemental sulfur.

12. A sulfur containing organosilicon compound corresponding to the general formula



where Alk is a divalent hydrocarbon radical with 1 to 10 carbon atoms in the claim or a divalent hydrocarbon radical with 1 to 10 carbon atoms which is interrupted once or twice by —O—, —S— or —NH— and x is a number from 2.0 to 6.0.

3,997,582

PROCESS AND CATALYST FOR SYNTHESIZING A GASEOUS HYDROCARBON MIXTURE HAVING A HIGH METHANE CONTENT FROM CARBON MONOXIDE AND HYDROGEN

Surjit Singh Khera, Upper Arlington, Ohio, assignor to Battelle Development Corporation, Columbus, Ohio

Filed Dec. 8, 1975, Ser. No. 638,839

Int. Cl.² C07C 1/04, 1/16

U.S. Cl. 260—449.6 M **8 Claims**

1. A process for the synthesis of a gaseous hydrocarbon mixture having a high methane content comprising:

a. contacting hydrogen and carbon monoxide in a volume ratio of about 47:53 to about 60:40 at a temperature of about 350° to about 450° C. and a pressure of about 200 to about 10,000 p.s.i.g. at a space velocity of about 500 to about 6000 with a catalyst comprising an interspersed mixture of cobalt oxide, aluminum oxide and zinc oxide which mixture by elemental analysis contains less than about 0.5 weight percent of alkali metal, said catalyst comprising about 1 to about 15 weight percent of cobalt oxide, about 15 to about 60 weight percent of aluminum oxide and about 35 to about 70 weight percent of zinc oxide; and

b. recovering a gaseous hydrocarbon product of said synthesis comprising a hydrocarbon mixture having a high methane content.

3,997,583

3'-CHLORO-4'-THIOCYANATOHYDROCINNAMANILIDE

Stanford S. Pelosi, Jr., Norwich, N.Y., assignor to Morton-Norwich Products, Inc., Norwich, N.Y.

Filed Jan. 16, 1976, Ser. No. 649,585

Int. Cl.² C07C 161/02

U.S. Cl. 260—454 **1 Claim**

1. The compound 3'-chloro-4'-thiocyanatohydrocinnamanilide.

3,997,584

SUBSTITUTED GLYCINES AND INTERMEDIATES THEREOF

John G. Gleason, Cornwall Heights, Pa.; Kenneth G. Holden, Haddonfield, N.J., and Nelson C. F. Yim, Philadelphia, Pa., assignors to SmithKline Corporation, Philadelphia, Pa.

Division of Ser. No. 447,468, Feb. 28, 1974, Pat. No. 3,920,730. This application Oct. 3, 1975, Ser. No. 619,266

Int. Cl.² C07C 155/02

U.S. Cl. 260—455 A **4 Claims**

1. A compound of the formula:

where:

R^1 is lower alkyl of one to four carbon atoms, β,β,β-trichloroethyl, benzyl, p-nitrobenzyl or p-methoxybenzyl;

Y is S;

R^2 is hydrogen or an easily removable carboxyl protective group;

Z is

and

R^3 is lower alkyl of one to four carbon atoms; phenyl or benzyl, the phenyl or benzyl group being unsubstituted or substituted with lower alkyl, lower alkoxy, hydroxy, halo, nitro or amino.

3,997,585

ALIPHATIC SULFAMATES

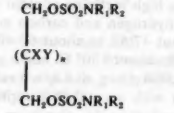
Allen Frederick Hirsch, Somerville, N.J., assignor to Ortho Pharmaceutical Corporation, Raritan, N.J.

Filed Dec. 30, 1974, Ser. No. 537,613

Int. Cl.² C07C *143/74*

U.S. Cl. 260—456 A **9 Claims**

1. A compound of the formula



wherein n is an integer from 0 to 8 and X and Y are hydrogen, provided that when n is 1, X and Y are hydrogen, lower alkyl having 1–3 carbon atoms, phenyl, benzyl or phenethyl; R_1 and R_2 are hydrogen, alkyl having 1–7 carbon atoms, phenyl, benzyl, phenethyl or cycloalkyl having 5–6 carbon atoms.

3,997,586

CYCLOPROPANECARBOXYLIC ACIDS AND ESTERS

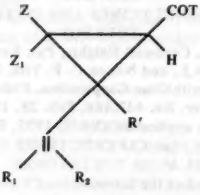
Jacques Martel, Bondy; Chanh Huynh, Villemomble, and Jean Buendia, Fontenay Sous Bois, all of France, assignors to Roussel-UCLAF, Paris, France

Division of Ser. No. 168,441, Aug. 2, 1971, Pat. No. 3,786,052, which is a continuation-in-part of Ser. No. 662,278, Aug. 22, 1967, abandoned, and Ser. No. 879,942, Nov. 25, 1969, abandoned. This application Sept. 7, 1973, Ser. No. 395,146

Int. Cl.² C07C *69/14, 61/12;* **C07D** *307/26*

U.S. Cl. 260—468 H **10 Claims**

1. A compound selected from the group consisting of a racemic or optically-active cyclopropane carboxylic derivative having the formula



wherein Z and Z_1 are methyl, T is selected from the group consisting of hydroxy and OT′, T′ being selected from the group consisting of lower alkyl and 2-T″-3-methyl-1-oxo-2-cyclopentene-4-yl, T″ is selected from the group consisting of lower alkenyl, cycloalkenyl of 3 to 7 carbon atoms, and furfuryl, R_1 and R_2 together with the carbon they are attached represent an alkylene of 3 to 7 carbon atoms, R′ is hydrogen.

3,997,587

D1- AND 8R-9-FLUORO-PROSTADIENOIC ACID DERIVATIVES

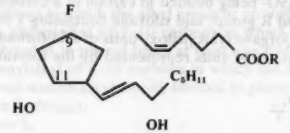
Joseph M. Muchowski, and Esperanza V. Velarde, both of Mexico City, Mexico, assignors to Syntex (U.S.A.) Inc., Palo Alto, Calif.

Filed June 26, 1975, Ser. No. 590,661

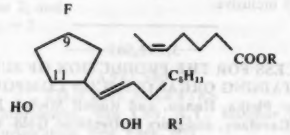
Int. Cl.² C07C *177/00*

U.S. Cl. 260—468D **41 Claims**

1. A dl- or 8R-antimeric compound selected from those of the formulas:



(A)



(B)

wherein R is hydrogen, a lower alkyl group of one to six carbon atoms, or the pharmaceutically acceptable, non-toxic salts of compounds in which R is hydrogen;

R^1 is methyl or ethyl; and

the wavy lines ( ) represent the α or β configuration or mixtures thereof, provided that when R^1 is α, the hydroxyl group, attached to the same carbon atom as R^1, is β; and when R^1 is β, the hydroxyl group, attached to the same carbon as R^1, is α.

3,997,588

3,5-BISOXYGENATED 2-(ω-HALO-3-OXYGENATED-1-ALKENYL)-CYCLOPENTANE-1-HEPTANOIC ACIDS AND DERIVATIVES THEREOF

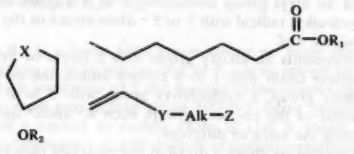
Richard A. Mueller, Northbrook, Ill., assignor to G. D. Searle & Co., Chicago, Ill.

Filed May 15, 1975, Ser. No. 577,675

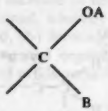
Int. Cl.² C07C *177/00*

U.S. Cl. 260—468 D **10 Claims**

1. A compound of the formula



wherein R_1 is hydroger or an alkyl radical containing 1–12 carbon atoms; R_2 is hydrogen, a tetrahydropyran-2-yl or trialkylsilyl radical, or alkanoyl radical containing 1–12 carbon atoms; X is a hydroxymethylene radical; Y is a radical of the formula



A being hydrogen or an alkanoyl radical containing 1–12 carbon atoms and B being hydrogen or an alkyl radical containing 1–12 carbon atoms; Z is a chloro, bromo, or iodo radical; Alk is an alkylene radical containing 3–8 carbon atoms; and the wavy lines represent the alternative α and β sterochemical configurations.

3,997,589

4-(2'-FLUORO-4-BIPHENYLYLR-4-OXO-BUTYRIC ACID AND ESTERS AND SALTS THEREOF

Ernst Seeger; Wolfhard Engel; Josef Nickl, and Helmut Teufel, all of Biberach an der Riss, Germany, assignors to Boehringer Ingelheim GmbH, Ingelheim am Rhein, Germany

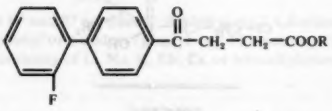
Continuation-in-part of Ser. No. 234,346, March 13, 1972, abandoned. This application Jan. 23, 1975, Ser. No. 543,266

Claims priority, application Germany, Mar. 17, 1971, 2112716; Mar. 17, 1971, 2112715; Mar. 17, 1971, 2112840

Int. Cl.² C07C *65/20, 69/76*

U.S. Cl. 260—469 **12 Claims**

1. A compound of the formula



wherein R is hydrogen or alkyl of 1 to 4 carbon atoms, or, when R is hydrogen, a non-toxic salt thereof formed with an inorganic or organic base.

11. A pharmaceutical dosage unit composition consisting essentially of an inert pharmaceutical carrier and an effective antiphlogistic amount of a compound according to claim 1.

12. The method of counteracting inflammation and fever in a warm-blooded animal, which comprises administering to said animal an effective antiphlogistic amount of a compound according to claim 1.

3,997,590

KETO-ESTERS

Michael George Lester, Edinburgh, Scotland, assignor to B.D.H. Pharmaceuticals Ltd., Edinburgh, Scotland

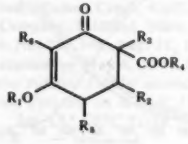
Filed June 28, 1973, Ser. No. 374,817

Claims priority, application United Kingdom, July 14, 1972, 33070/72

Int. Cl.² C07C *69/95*

U.S. Cl. 260—470 **16 Claims**

1. A cyclohexenone ester of the formula:



or a pharmaceutically acceptable acid addition salt thereof, wherein,

R_1 is either

1. a straight or branched chain C_1 to C_9 alkyl group,
2. a cyclopentyl group,
3. an allyl group,
4. a propynyl group,
5. a benzyl group,
6. a phenyl group, or
7. a group of the formula $-(CH_2)_mY$ in which Y is either a $C(F)_3$, $C(Cl)_3$, hydroxy, hydroxyethoxy, hydroxyethoxyethoxy, C_1 to C_4 alkoxy, C_1 to C_2 alkoxyethoxy, acetoxy, propionyloxy, benzoyloxy or C_1 to C_2 alkoxycarbonyl group or Y is a $-S-(CH_2)_nOZ$ group, in which Z is an acetyl group, m and n which may be the same or different, each represent integers of 1 to 3;

R_2 is a phenyl, phenyl (C_1 to C_3) alkyl or styryl group or such a group in which the phenyl portion is substituted by at least one C_1 to C_2 alkyl, C_1 to C_2 alkoxy, methoxymethyl, methylenedioxy, ethoxycarbonyl, trifluoromethyl, nitro, halogen, nitrile, phenyl, diethylaminocarbonyl, amino, di (C_1 to C_2) alkylamino or benzyloxy group;

R_3 is either

1. a hydrogen atom,
2. a straight or branched chain C_1 to C_9 alkyl group or such a group substituted with an ethoxycarbonyl, carboxyl, or dimethylamino group,
3. an allyl group substituted with a hexanoyl or an ethoxycarbonyl group,
4. a propynyl group, or
5. a benzyl group;

R_4 is either

1. a straight or branched chain C_1 to C_6 alkyl group,
2. an ethoxyalkyl group,
3. an allyl group, or
4. a benzyl group;

R_5 is either a hydrogen atom, a C_1 to C_6 alkyl, phenyl or ethoxycarbonyl group; and

R_6 is a hydrogen atom, or a C_1 to C_6 alkyl or phenyl group.

3,997,591

TRICYCLIC BENZODIAZEPINES

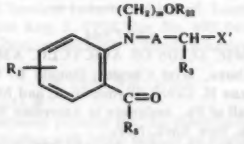
Michael Edward Derieg, Caldwell; James Valentine Earley, Cedar Grove; Rodney Ian Fryer, North Cadwell, and Leo Henryk Sternbach, Upper Montclair, all of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Division of Ser. No. 557,438, March 11, 1975, Pat. No. 3,965,151, which is a divisjon of Ser. No. 45,928, June 12, 1970, abandoned, which is a continuation-in-part of Ser. No. 26,068, April 6, 1970, Pat. No. 3,905,956, which is a continuation-in-part of Ser. No. 863,377, Oct. 2, 1969, abandoned, which is a continuation-in-part of Ser. No. 768,909, Oct. 18, 1968, abandoned. This application Apr. 12, 1976, Ser. No. 675,658

Int. Cl.² C07C *149/60*

U.S. Cl. 260—470 **1 Claim**

1. Compounds of the formula



wherein R_1 is hydrogen, nitro, trifluoromethyl, halogen, lower alkyl, lower alkyl mercapto or lower alkoxy; R_3 is the group -COO- lower alkyl; R_5 is phenyl and phenyl substituted with a member selected from the group consisting of halogen, nitro, trifluoromethyl and lower alkyl; R_{22} is lower alkanoyl; m is an integer from 1–7; A is selected from the group consisting of $-CH_2-$ and

and X′ is chlorine, bromine or iodine.

3,997,592

PREPARATION OF AQUEOUS DISPERSIONS OF BLOCKED AROMATIC POLYISOCYANATES

Carl Albert Aufdermarsh, Jr., Newark, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Nov. 24, 1975, Ser. No. 634,641

Int. Cl.² C07C *125/06*

U.S. Cl. 260—471 C **8 Claims**

1. A process for the production of an aqueous dispersion of an aromatic polyisocyanate blocked with a phenolic compound which comprises mixing (a) an aromatic polyisocyanate and (b) an aqueous solution containing a dissolved phenolic compound selected from the class consisting of phenol, resorcinol and C_1 to C_{15} alkyl derivatives of phenol and C_1 to C_{15} alkyl derivatives of resorcinol, at a temperature above the melting point of the polyisocyanate, in the presence of an effective amount of a basic catalyst, the number of moles of phenolic compound being at least equal to the number of equivalents of isocyanate groups present.

3,997,593

ORGANIC COMPOUNDS

Paul Stadler, Biel-Benken, and Gernot Wersin, Locarno, both of Switzerland, assignors to Sandoz Ltd., Basel, Switzerland

Filed June 5, 1975, Ser. No. 583,884

Claims priority, application Switzerland, June 12, 1974, 8027/74

Int. Cl.² C07C *69/66*

U.S. Cl. 260—484 P **8 Claims**

1. A process for the production of a compound of formula I:

I

wherein

R′ is alkyl of 1 to 6 carbon atoms or cycloalkyl of 3 to 6 carbon atoms, and

R is, alkyl of 1 to 6 carbon atoms

by oxidizing a compound of formula II,

II

wherein R and R′ are defined above, with nitric acid.

3,997,594

HYDROXAMIC ACIDS OF ALICYCLIC AMINO ACIDS

Harvey E. Alburn, West Chester; Donald E. Clark, Norristown; Norman H. Grant, Wynnewood, and Milton Lapidus, Rosemont, all of Pa., assignors to American Home Products Corporation, New York, N.Y.

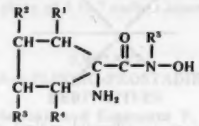
Continuation-in-part of Ser. No. 464,372, April 26, 1974, abandoned, which is a continuation-in-part of Ser. No. 255,747, May 22, 1972, abandoned, which is a continuation-in-part of Ser. No. 874,381, Nov. 5, 1969, Pat. No. 3,703,543. This application July 28, 1975, Ser. No. 599,615

The portion of the term of this patent subsequent to Nov. 21, 1989, has been disclaimed.

Int. Cl.² C07C *119/00, 103/30*

U.S. Cl. 260—500.5 H **2 Claims**

1. A compound of the following formula:



wherein:

R^1 and R^4 are selected from the group consisting of hydrogen, methyl, methoxy, hydroxy, nitro and amino; R^2 and R^3 are hydrogen, with the proviso that at least one of R^1 and R^4 is always hydrogen; R^5 is selected from the class consisting of hydrogen and lower alkyl; and the pharmaceutically-accepted acid-addition salts thereof.

3,997,595

2-CHLOROETHANEPHOSPHONIC ACID DERIVATIVES

Johann Jung, Limburgerhof; Karl Kiehs, Lampertheim, and Hans Theobald, Limburgerhof, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany

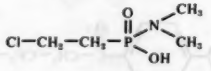
Filed Feb. 12, 1975, Ser. No. 549,332

Claims priority, application Germany, Feb. 23, 1974, 2408863

Int. Cl.² C07F *9/38*

U.S. Cl. 260—502.5 **1 Claim**

1. A compound of the formula



3,997,596

UNSATURATED CARBOXYLIC SALT MATERIALS AND DERIVATIVES THEREOF

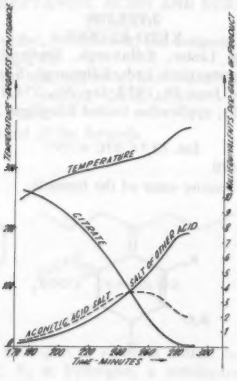
Fred Smeets, Tienen, Belgium, assignor to Citrex S.A., Saint-Gilles-lex-Brussels, Belgium

Continuation of Ser. No. 877,588, Nov. 24, 1969, abandoned, which is a division of Ser. No. 563,816, July 8, 1966, Pat. No. 3,586,715. This application Nov. 18, 1975, Ser. No. 633,039

Claims priority, application United Kingdom, July 19, 1965, 30640/65

Int. Cl.² C07C *143/12*

U.S. Cl. 260—513 B **11 Claims**



1. A method of preparing sulphonated salt material, which comprises (a) heating an alkaline-earth metal salt of citric acid to a temperature in the range of 230° C. to 400° C. for a

period of time until an increase in titratable alkalinity of the reaction mixture is obtained, whereby an unsaturated organic salt material is obtained, (b) forming an aqueous solution or dispersion of the unsaturated organic salt material and (c) contacting said solution or dispersion with a bisulphite ion under acid conditions.

3,997,597

ALKALI METAL OR TETRAALKYLAMMONIUM ARYLCARBAMATES

Robert F. Bridger, Hopewell; El-Ahmadi I. Heiba, and Stamoulis Stournas, both of Princeton, all of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Division of Ser. No. 310,752, Nov. 30, 1972, Pat. No. 3,849,320. This application June 17, 1974, Ser. No. 479,739

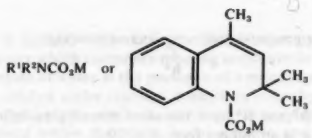
Int. Cl.² C07C *125/02*

U.S. Cl. 260—518 R **6 Claims**

1. Aryl carbamates having the structure:

$R^1R^2NCO_2M$

or



in which R^1 and R^2 are phenyl, naphthyl, p-(2,4,4-trimethyl-2-pentyl)phenyl or p-dodecyl phenyl; and M is selected from the group consisting of Li, Na, K, Rb, Cs, or tetraalkylammonium.

3,997,598

PROCESS FOR PURIFYING SORBIC ACID

Hans Fernholz, Fischbach, Taunus; Hans-Joachim Schmidt, Falkenstein, Taunus, and Friedrich Wunder, Florsheim, Main, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed June 20, 1974, Ser. No. 481,461

Claims priority, application Germany, June 22, 1973, 2331668

Int. Cl.² C07C *51/42*

U.S. Cl. 260—526 N **21 Claims**

1. A process for purifying sorbic acid which comprises dissolving crude sorbic acid in an aqueous solution, at an elevated temperature in the range of 50° to 100° C, said solution containing at least 15 percent by weight of a water soluble alkali metal or ammonium salt of a monocarboxylic acid having only carbon, hydrogen and oxygen atoms or a phosphoric acid, and subsequently cooling and crystallizing pure sorbic acid from said solution and separating the crystallized sorbic acid from the solution.

3,997,599

EXTRACTION OF CARBOXYLIC ACIDS FROM DILUTE AQUEOUS SOLUTIONS

Robert R. Grinstead, Walnut Creek, Calif., assignor to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 285,546, Aug. 31, 1972, Pat. No. 3,816,524. This application May 6, 1974, Ser. No. 467,328

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 9, 1976

Int. Cl.² C07C *51/48*

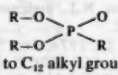
U.S. Cl. 260—527 R **3 Claims**

1. A process for the recovery of lower carboxylic acids from dilute aqueous solution, comprising:

contacting said aqueous solution with a water-immiscible, liquid organic solvent for said acid,

said aqueous solution having a lower carboxylic acid content of two percent or less by weight, said content consisting of one or more two to four carbon mono- or dicarboxylic acids substituted with from zero to three chlorines or fluorines, or with zero or one hydroxyl, oxo, cyano, methoxyl or ethoxyl group, the carbon to oxygen atomic ratio in each of said acids being not less than 1.0 nor greater than 2.0,

said organic solvent comprising a total of at least one weight percent of one or more dialkyl alkyl phosphonate polar extractants of the formula:



wherein each R is a C_2 to C_{12} alkyl group and the total number of carbons in the molecule is from 10 to 36,

and separating the resulting loaded extractant and raffinate solutions.

3,997,600

METHOD OF PREPARING ACRYLIC ACID

Natale Ferlazzo, Segrate (Milan); Gian Fausto Buzzi, Arona (Novara), and Marcello Ghirga, Bresso (Milan), all of Italy, assignors to Societa' Italiana Resine S.I.R. S.p.A., Milan, Italy

Filed Nov. 18, 1974, Ser. No. 524,834

Claims priority, application Italy, Nov. 28, 1973, 31750/73

The portion of the term of this patent subsequent to May 11, 1993, has been disclaimed.

Int. Cl.² C07C *51/32*

U.S. Cl. 260—530 N **14 Claims**

1. A method of preparing acrylic acid comprising contacting with an oxidation catalyst at a temperature not exceeding 320° C a gaseous mixture comprising acrolein, oxygen and methanol in a proportion by volume from 0.05 to 0.5% of methanol and a molar ratio of acrolein to methanol from 10:1 to 100:1, and wherein the said catalyst is a calcined metal oxide catalyst chosen from the group of compounds defined by the following formulae:

$Mo_a\ V_b\ Me_c\ O_x$

$Mo_a\ W_e\ Me_c\ O_y$

$Mo_a\ V_b\ W_c\ Me_c\ O_z$

wherein Me is an element chosen from the group consisting of chromium, manganese, iron, cobalt, nickel, copper, zinc, silver, cadmium, gold, mercury, sodium, barium, calcium, cerium, bismuth, thorium, uranium, lead, antimony, tin, phosphorus and boron; and wherein a, b, c, d, x, y, z are numbers varying, respectively: a from 6 to 12, b from 1 to 6, c from 0 to 5, d from 1 to 6, x from 20.5 to 58.5, y from 21 to 61.5 and z from 23.5 to 76.5.

3,997,601

ADIPIC ACID MANUFACTURE

Philip Edward Langley, Stockton-on-Tees, England, assignor to Imperial Chemical Industries Limited, London, England

Filed Aug. 5, 1974, Ser. No. 495,041

Claims priority, application United Kingdom, Aug. 20, 1973, 39223/73

Int. Cl.² C07C *51/28*

U.S. Cl. 260—531 R **6 Claims**

1. In a continuous process for the manufacture of adipic acid by the oxidation with nitric acid of an organic feedstock consisting essentially of cyclohexanol, cyclohexanone or mixtures thereof, the improvement which consists essentially of:

a. oxidizing the reaction mixture of organic feedstock with nitric acid at a temperature of 70° to 90° C in a reaction vessel;

b. controlling the temperature of the reaction mixture in said reaction vessel between 70° and 90° C by recycling the reaction mixture through a cooling circuit external to the reaction vessel and containing at least one cooler;

c. feeding nitric acid to the reaction vessel; and

d. feeding at least a part of the organic feedstock to the cooling circuit upstream of at least one cooler, the recycle rate of the reaction mixture being at least twice the rate at which fresh reactants are fed, whereby adipic acid is formed without crystallisation of adipic acid in the reactor.

3,997,602

PRODUCTION OF ACETIC ACID USING A VANADIUM TETROXIDE/NON-POROUS SILICA CO-CATALYST COMPOSITION

Paul D. Taylor, Clinton, N.J., assignor to Celanese Corporation, New York, N.Y.

Filed Nov. 25, 1974, Ser. No. 526,659
Int. Cl.² C07C *51/20*
U.S. Cl. 260—533 R **10 Claims**

1. A process for preparing acetic acid by the vapor phase oxidation of butane which process comprises reacting said butane and an oxygen-containing gas in the vapor phase in the presence of steam and a catalytic amount of a co-catalyst composition of vanadium tetroxide and finely divided, non-porous silica particles wherein said co-catalyst composition consists essentially of from about 50 to about 95 percent by weight vanadium tetroxide and from about 5 to about 50 percent by weight non-porous silica particles.

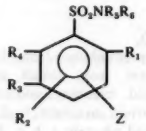
3,997,603

HERBICIDAL HALO-DI-ALKYL BENZENESULFONAMIDES

Elmore Louis Martin, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 334,411, Feb. 21, 1973, Pat. No. 3,888,897, which is a continuation-in-part of Ser. No. 243,404, April 12, 1972, abandoned. This application Oct. 15, 1974, Ser. No. 515,071
Int. Cl.² C07C *143/78*; A01N *9/16*
U.S. Cl. 260—556 AR **2 Claims**

1. A compound of the formula



where

Z is chlorine or bromine;

R_2, R_4 and R_5 are hydrogen;

R_6 is hydrogen, lithium, potassium, or sodium;

R_1 is alkyl of 3 to 5 carbon atoms; and

R_3 is alkyl of 3 to 5 carbon atoms.

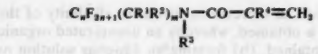
3,997,604

MIXTURES OF PERFLUOROALIPHATIC SUBSTITUTED AMINO COMPOUNDS AND THE METHOD FOR PREPARING THE SAME

Louis Foulletier, Ouillins, and Jean-Pierre Lalu, La Mulatieres, both of France, assignors to Produits Chimiques Ugine Kuhlmann, France

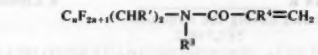
Continuation-in-part of Ser. Nos. 694,081, Dec. 28, 1967, abandoned, and Ser. No. 819,480, April 25, 1969, abandoned. This application Apr. 29, 1971, Ser. No. 138,810
Claims priority, application France, Jan. 2, 1967, 67.89676; Sept. 15, 1967, 67.121188; Nov. 7, 1967, 67.127254; Apr. 29, 1968, 68.149848
Int. Cl.² C07C *103/58*
U.S. Cl. 260—561 N **9 Claims**

1. A perfluoralkyl substituted amino compound of the formula

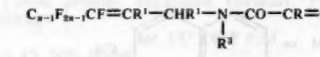


wherein n is an integer from 6 to 20, m is 2 or 4, R^1 and R^2 each is hydrogen atom or a lower alkyl with 1 to 3 carbon atoms, R^3 is a hydrogen atom, an alkyl containing 1 to 20 carbon atoms, an alkenyl containing 3 to 10 carbon atoms, a cycloalkyl radical containing 3 to 12 carbon atoms, a cycloalkenyl with 5 to 12 carbon atoms, an N or O ring substituted cycloalkenyl radical containing 5 to 12 carbon atoms, an aryl, the radical of $-(CHR)_q-OH$ wherein R is a hydrogen atom or a lower alkyl containing 1 to 3 carbon atoms, and R^4 is a hydrogen atom or a methyl group.

7. A composition of matter comprising a perfluoralkyl substituted amino compound of the formula



together with a perfluoraliphatic substituted amino compound of the formula



wherein R^1, R^3 and R^4 have the same meaning as defined in claim 1 and n is an integer from 4 to 20.

3,997,605

PREPARATION OF FORMAMIDE COMPOUNDS

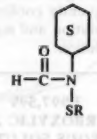
Roger J. Hopper, Akron, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed May 19, 1975, Ser. No. 578,460
Int. Cl.² C07C *103/02*, *103/30*
U.S. Cl. 260—561 S **9 Claims**

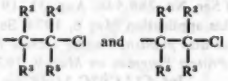
1. A process of preparing N,N′-di(cyclohexyl)-N,N′-dithiobis(formamide) comprising reacting N-cyclohexylformamide with sulfur monochloride in the presence of an organic hydrogen chloride acceptor.

2. A process of preparing N-chlorothio-N-cyclohexyl-formamide comprising reacting N,N′-di(cyclohexyl)-N,N′-dithiobis(formamide) with a chloro compound selected from the group consisting of sulfuryl chloride and chlorine.

4. A compound selected from the group consisting of N,N′-di(cyclohexyl)-N,N′-dithiobis(formamide); and compounds having the following structural formula



wherein R is selected from the group consisting of

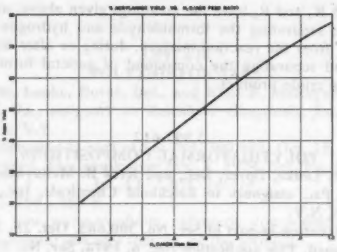


wherein R^2, R^3, R^4 and R^5 are selected from the group consisting of hydrogen and alkyl radicals having from 1 to 10 carbon atoms and R^2 and R^4 can be taken together to represent $-(CH_2)_{n'}$ — where n' is 3 to 6.

3,997,606
METHOD OF PRODUCING DRY ACRYLAMIDE

James Kane, Olympia Fields, Ill., assignor to Nalco Chemical Company, Oak Brook, Ill.

Filed Dec. 3, 1975, Ser. No. 637,252
Int. Cl.² C07C *103/133*
U.S. Cl. 260—561 N 2 Claims



1. A method of producing acrylamide containing less than 5% water which comprises reacting acrylonitrile with from 0.3 to 1 mole of water in the presence of a metallic nitrile conversion catalyst under reaction conditions whereby at least 30% by weight of the nitrile is converted to acrylamide which is dissolved within the nitrile water mixture and then directly reducing the pressure or temperature or both pressure and temperature of said mixture whereby acrylamide crystals are formed and then recovering said crystals.

3,997,607
RECYCLING PROCESS FOR THE PREPARATION OF CYCLOHEXANONE OXIME

Abraham H. de Rooij, Geleen, Netherlands, assignor to Stamicarbon B.V., Geleen, Netherlands

Continuation-in-part of Ser. Nos. 542,045, Jan. 17, 1975, and Ser. No. 564,085, April 1, 1975, said Ser. No. 542,045, is a continuation-in-part of Ser. No. 95,389, Dec. 4, 1970, and Ser. No. 95,318, Dec. 4, 1970, said Ser. No. 564,085, is a continuation-in-part of Ser. No. 422,711, Dec. 7, 1973, and Ser. No. 422,713, Dec. 7, 1973. This application Apr. 24, 1975, Ser. No. 571,396
Claims priority, application Netherlands, Apr. 26, 1974, 7405630
Int. Cl.² C07C *131/04*
U.S. Cl. 260—566 A 8 Claims

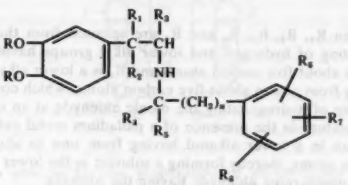
1. In a cyclic process for producing cyclohexanone oxime, comprising recycling an acidic buffered aqueous reaction medium containing an ammonium salt as a buffer salt between a zone (A) for the synthesis of hydroxyl-ammonium salt, in which zone hydroxyl-ammonium ions are formed by catalytic reduction of nitrate ions and a zone (B) for the synthesis of cyclohexanone oxime, in which zone the resulting hydroxyl-ammonium ions react with cyclohexanone to form cyclohexanone oxime; wherein nitrate ions and cyclohexanone are fed to zones A and B, respectively, and wherein cyclohexanone oxime is discharged from zone (B); and wherein the said recycled reaction medium is treated after leaving zone (B) and before it is fed back into zone (A) to remove residual amounts of cyclohexanone and cyclohexanone oxime, the improvement consisting of heating at least a portion of said recycled liquid at a temperature of at least 120° C, in the presence of nitrous gases, and at an absolute pressure of over 1 atmosphere, after said recycled liquid has been discharged from zone (B) and before it is fed to the zone for the synthesis of hydroxy-ammonium salt (A).

3,997,608
N-SUBSTITUTED-DIHYDROXYPHENETHYLAMINES

John T. Suh, Mequon, Wis., assignor to Richardson-Merrell Inc., Wilton, Conn.

Continuation-in-part of Ser. No. 376,686, July 5, 1973, Pat. No. 3,894,051. This application Feb. 5, 1975, Ser. No. 547,214
Int. Cl.² C07C *87/28*
U.S. Cl. 260—570.8 R 7 Claims

1. A compound of the formula:



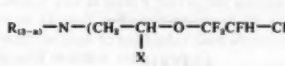
in which R is hydrogen, an alkyl of 1 to 4 carbon atoms or benzyl, R_1 is a straight chain alkyl of 1 to 7 carbon atoms, a branched chain alkyl of 3 to 7 carbon atoms, or a cycloalkyl of 3 to 7 carbon atoms, R_2, R_3 and R_4 are hydrogen or lower alkyl of 1 to 4 carbon atoms, R_5 is a lower alkyl of 1 to 4 carbon atoms, R_6, R_7 and R_8 are hydroxy, lower alkoxy of 1 to 4 carbon atoms, chloro, bromo or fluoro, or trifluoromethyl, and n is 1 or 2.

3,997,609
PARTIALLY FLUORINATED AMINO ETHERS

Thomas Martini, Neuenhain, Taunus, and Siegfried Benninger, Schwalbach, Taunus, both of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

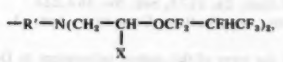
Filed Feb. 7, 1974, Ser. No. 440,569
Claims priority, application Germany, Feb. 9, 1973, 2306464
Int. Cl.² C07C *93/02*
U.S. Cl. 260—584 C 7 Claims

1. Fluorine-containing tert. amine having the formula



(I)

wherein n represents an integer from 1 to 3, X is H or CH_3 and R represents identical or different alkyl groups having from 1 to 12 carbon atoms or, if n is 2, represents the group



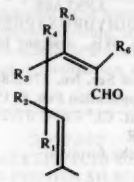
R′ being an alkylene group having from 2 to 12 carbon atoms.

3,997,610
PROCESS FOR THE RECOVERY OF CITRONELLAL FROM SOLUTIONS THEREOF

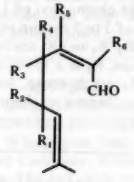
Emile Mourier, Sainte-Foy-les-Lyon, France, assignor to Rhone-Poulenc S.A., Paris, France

Division of Ser. No. 356,677, May 2, 1973, Pat. No. 3,971,831. This application Mar. 20, 1975, Ser. No. 560,657
Int. Cl.² C07C *47/02*
U.S. Cl. 260—601 R 12 Claims

1. In the process for the selective hydrogenation of the olefinic group in a conjugated position to the carbonyl group in dienic aldehydes having the formula:



wherein R_1, R_2, R_3, R_4 and R_6 are selected from the group consisting of hydrogen and lower alkyl groups having from one to about five carbon atoms and R_5 is a lower alkyl group having from one to about five carbon atoms, which comprises the step of hydrogenating the dienic aldehyde at an elevated temperature in the presence of a palladium metal catalyst in solution in a lower alkanol having from one to about five carbon atoms, thereby forming a solution in the lower alkanol of an unsaturated aldehyde having the formula:



wherein R_1, R_2, R_3, R_4 and R_6 are selected from the group consisting of hydrogen and lower alkyl groups having from one to about five carbon atoms and R_5 is a lower alkyl group having from one to about five carbon atoms; and then recovering the unsaturated aldehyde from the solution by distillation of the lower alkanol at the distillation temperature of the alkanol at system pressure, the improvement which comprises carrying out the distillation of the alkanol in the presence of an alkali or alkaline earth metal salt of a boric acid, and then recovering the unsaturated aldehyde.

3,997,611
PRODUCTION OF TERTIARY PHOSPHINE OXIDES

Bernd Lippsmeier, Hürth-Knapsack; Klaus Hestermann, Erftstadt Bliesheim, and Hubert Neumaier, Hürth-Knapsack, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Mar. 26, 1975, Ser. No. 562,222

Claims priority, application Germany, Apr. 1, 1974, 2415801

The portion of the term of this patent subsequent to Dec. 21, 1993, has been disclaimed

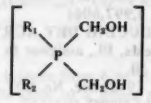
Int. Cl.² C07F 9/02

U.S. Cl. 260—606.5 P **9 Claims**

1. A process for making tertiary phosphine oxides of the general formula (I):

(I)

in which R_1 and R_2 are selected from the group consisting of alkyl, alkenyl, alkinyl, cycloalkyl, aralkyl and aryl having from 1 to 18 carbon atoms, which comprises splitting of formaldehyde and hydrogen halide at temperatures within the range about 150° and 350° C, in the presence of hydrogen halide, from a molten compound of the general formula (II):



(II)

in which R_1 and R_2 have the meanings given above, and X is halogen; separating the formaldehyde and hydrogen halide split off from the reaction mixture, during or after the reaction; and separating the compound of general formula (I) from the crude product.

3,997,612
POLYTHIAFORMAL COMPOSITIONS

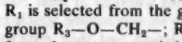
Gerd M. Lenke, Dover, Del., and Kent B. McReynolds, Telford, Pa., assignors to Reichhold Chemicals, Inc., White Plains, N.Y.

Continuation-in-part of Ser. No. 300,685, Oct. 25, 1972, abandoned. This application Dec. 6, 1974, Ser. No. 530,105

Int. Cl.² C07C 149/14

U.S. Cl. 260—609 R **10 Claims**

1. A new water-insoluble polymeric composition having polythiaformal linkages therein, of the formula:



wherein R_1 is selected from the group consisting of hydrogen and the group $R_3—O—CH_2—$; R_2 and R_3 are independently selected from the group consisting of hydrogen and the monovalent residue of monothiols, said residue of monothiols being present in the statistical average polymer chain at least to about 50 mole percent of the terminal groups; A is the divalent residue of thiadiols having at least 4 carbon atoms; and n is an integer from 2 to 40, said monothiols selected from the group consisting of primary alkyls and aralkyls and mixtures thereof, and said thiadiols selected from the group consisting of primary thiaalkylenes, oxa-thiaalkylenes and mixtures thereof.

3,997,613
POLYACETAL AND POLYKETAL COMPOSITIONS

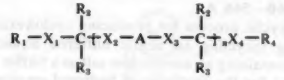
Gerd M. Lenke, Dover, Del., and Kent B. McReynolds, Telford, Pa., assignors to Reichhold Chemicals, Inc., White Plains, N.Y.

Continuation-in-part of Ser. No. 300,685, Oct. 25, 1972, abandoned. This application Dec. 6, 1974, Ser. No. 530,106

Int. Cl.² C07C 149/14

U.S. Cl. 260—609 R **15 Claims**

1. A new water-insoluble polymeric composition having polythiaacetal-ketal linkages therein, of the formula:



Wherein: R_1 and R_4 are independently selected from the group consisting of hydrogen and a monovalent residue of monomercaptans and monoalcohols, said monovalent residue that forms terminal groups being present in the statistical average polymer chain at least to about 50 mole percent of the terminal groups, and R_1 and R_4 are not both hydrogen in the statistical average polymer chain; R_2 and R_3 are independently selected from the group consisting of hydrogen and perchlorocarbyl and chlorohydrocarbyl radicals each having from 1 to 10 carbon atoms. X_1, X_2, X_3 and X_4 being independently selected from the group consisting of sulphur and oxygen with at least 30 mole percent of sulfur present in the total selection; A is the divalent residue of the compounds selected from the group consisting of dimercaptans, monomercapto alcohols and diols; and n is an integer from 2 to 50; said monovalent

residue selected from the group consisting of primary alkyl, thia-alkyl, oxa-alkyl, aralkyl, alkenyl and mixtures thereof; and said divalent residue selected from the group consisting of primary alkylene, thiaalkylene, oxa-alkylene, aralkylene, and mixtures thereof.

3,997,614

POLYTHIAFORMALS

Gerd M. Lenke, Dover, Del., and Kent B. McReynolds, Telford, Pa., assignors to Reichhold Chemicals, Inc., White Plains, N.Y.

Continuation-in-part of Ser. No. 300,685, Oct. 25, 1972, abandoned. This application Dec. 6, 1974, Ser. No. 530,267

Int. Cl.² C07C *149/14*

U.S. Cl. 260—609 R **10 Claims**

1. A new water-insoluble polymeric composition having polythiaformal linkages therein, of the formula:

$$R_1-O\left[A-O-CH_2-O-O\right]_nR_2$$

wherein R_1 is selected from the group consisting of hydrogen and the group R_3-O-CH_2-; R_2 and R_3 are independently selected from the group consisting of hydrogen and monovalent residues of mono-alcohols and thiadiols, said residues of mono-alcohols being present in the statistical average polymer chain at least to about 20 mole percent of the terminal groups; A is the divalent residue of thiadiol having at least 4 carbon atoms; *n* is an integer from 2 through 40; said thiadiols selected from the group consisting of primary thiaalkylenes, oxa-thiaalkylenes, polythiaalkylenes, and mixtures thereof; and said mono-alcohols selected from the group consisting of primary alkyls, thiaalkyls, oxa-alkyls, aralkyls, alkenyls, and mixtures thereof.

3,997,615

PROCESS FOR RECOVERY OF ORTHO-PHENYLPHENOL

Joseph F. M. Klein, Bunde; Petrus A. M. J. Stijfs, Munstergeleen, and Josef A. Thomas, Sittard, all of Netherlands, assignors to Stamicarbon B.V., Geleen, Netherlands

Filed May 20, 1975, Ser. No. 579,053

Claims priority, application Netherlands, May 24, 1974, 7406965

Int. Cl.² C07C *37/34, 37/28*

U.S. Cl. 260—620 **6 Claims**

1. In a process for separating ortho-phenylphenol, from a mixture containing ortho-cyclohexylphenol cyclohexylcyclohexanone, biphenyl and diphenylene oxide, comprising treating the mixture with excess aqueous hydroxide, based on the total amount of phenols present in the mixture to isolate the ortho-cyclohexylphenol and ortho-phenylphenol as a second mixture; and catalytically dehydrogenating said second mixture to convert, ortho-cyclohexylphenol to ortho-phenylphenol, the improvement comprising treating said mixture with an amount of base which is less than a mole equivalent of the ortho-phenylphenol contained in the mixture, to form an alkaline medium containing said mixture; extracting the alkaline solution of said mixture with an inert organic solvent which is toluene, benzene, o-xylene, m-xylene, p-xylene or cyclohexane; acidifying said alkaline medium, and separating said ortho-phenylphenol from said acidified medium, thereby obviating said step of catalytic dehydrogenation to convert ortho-cyclohexylphenol to ortho-phenylphenol.

3,997,616

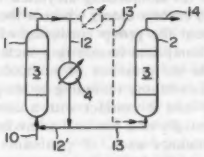
PROCESS FOR THE PREPARATION OF ALKYLTERALINS

Michiyuki Tokashiki, Tokuyama, and Hiroshi Sakai, Iwakuni, both of Japan, assignors to Teijin Limited, Osaka, Japan

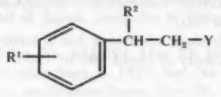
Filed June 27, 1975, Ser. No. 591,247

Int. Cl.² C07C *13/28*

U.S. Cl. 260—666 PY **4 Claims**



1. A process for the preparation of alkyltetralins which comprises feeding an alkenylbenzene of the formula



in which R^1 is a member of the group consisting of a hydrogen atom, and methyl and ethyl groups, R^2 is a hydrogen atom or methyl group, R^1 and R^2 are the same or different and Y represents $-CH=CH-CH_3$ or $-CH_2-CH=CH_2$, into a reaction zone contining a fixed bed of an acidic cyclization catalyst, and cyclizing it in the liquid phase at a temperature not higher than about 300° C., characterized in that:

i. at least a part of the reaction mixture containing the unreacted alkenylbenzene, which has been withdrawn from said reaction zone and in which the conversion of alkenylbenzene is below the intended final conversion, is cooled, and at least a part of the cooled reaction product in an amount sufficient to adjust the temperature of the reaction zone to not higher than about 300° C. is recycled to said reaction zone, and

ii. the remainder of the reaction product is led into another reaction zone containing a fixed bed of acidic cyclization catalyst, and without the aforesaid recycling, further cyclized in the liquid phase until the intended final conversion is attained.

3,997,617

4,9-CIS-1-CYCLOHEXYL-1,3,3-TRIMETHYLHYDRINDANE

Peter Hosler, Wallingford, and David S. Gates, Swarthmore, both of Pa., assignors to Sun Ventures, Inc., St. Davids, Pa.

Continuation-in-part of Ser. No. 218,338, Jan. 17, 1972, Pat. No. 3,929,923. This application Dec. 19, 1975, Ser. No. 642,224

Int. Cl.² C07C *13/28, 13/46*

U.S. Cl. 260—666 PY **3 Claims**

1. 4-9-Cis-1-cyclohexyl-1,3,3-trimethylhydrindane.

3,997,618

PROCESS FOR ISOMERIZING ALKYL BENZENES

Kurt W. Cornely, Westfield; Saul G. Hindin, Mendham, and Carl D. Keith, Summit, all of N.J., assignors to Engelhard Minerals & Chemicals Corporation, Murray Hill, N.J.

Continuation of Ser. No. 21,520, March 20, 1970, abandoned. This application May 23, 1975, Ser. No. 580,446

Int. Cl.² C07C 5/24

U.S. Cl. 260—668 A 12 Claims

1. A process for isomerizing alkylated benzene hydrocarbons of 8 to 10 carbon atoms wherein the alkyl substituents are selected from the group consisting of methyl and ethyl groups, which comprises isomerizing such alkylated benzene hydrocarbons in the presence of molecular hydrogen under isomerization conditions including a temperature of about 650° to 950° F and in contact with a catalyst, said catalyst consisting essentially of a physical admixture of

a. minor amounts each of platinum group metal and rhenium supported on a major amount of a porous, solid metal oxide base, said base having a surface area of at least about 100 square meters per gram and having a tertiary butylbenzene dealkylation activity at 455° C (without water addition) of up to about 15 cubic centimeters (STP) per gram per minute; and

b. 0.5 to 95% of a high acidity oxide component consisting essentially of a porous, solid metal oxide having a surface area of at least about 100 square meters per gram and having a tertiary butylbenzene dealkylation activity of at least about 500,

wherein the physical admixture has a tertiary butylbenzene dealkylation activity of about 400 to 1200.

3,997,619

PROCESS FOR THE SEPARATION OF ETHYLBENZENE

Richard W. Neuzil, Downers Grove, Ill., assignor to Universal Oil Products Company, Des Plaines, Ill.

Filed May 14, 1975, Ser. No. 577,489

Int. Cl.² C07C 7/13

U.S. Cl. 260—674 SA 20 Claims

1. A process for separating ethylbenzene from a feed mixture comprising ethylbenzene and a plurality of xylene isomers which comprises contacting said mixture with an adsorbent consisting essentially of a sodium-type Y zeolite having a SiO_2/Al_2O_3 mole ratio of greater than about 4.5, selectively adsorbing substantially all of said xylene isomers to the substantial exclusion of the ethylbenzene, and thereafter recovering high-purity ethylbenzene.

12. A process for separating ethylbenzene isomer from a hydrocarbon feed mixture consisting essentially of ethylbenzene and a plurality of xylene isomers which process comprises the steps of:

a. contacting said mixture with an adsorbent comprising a sodium-type Y zeolite having a SiO_2/Al_2O_3 mole ratio of greater than about 4.5 at adsorption conditions to effect the selective adsorption of substantially all of said xylene isomers to the substantial exclusion of ethylbenzene;

b. withdrawing from the adsorbent a raffinate stream comprising less selectively adsorbed ethylbenzene;

c. contacting the adsorbent at desorption conditions with a desorbent material having a boiling point substantially different from that of the feed mixture to effect the removal of the selectively adsorbed xylene isomers; and, l

d. withdrawing from the adsorbent an extract stream comprising said isomers.

3,997,620

PROCESS FOR SEPARATING PARA-XYLENE

Richard W. Neuzil, Downers Grove, Ill., assignor to UOP Inc., Des Plaines, Ill.

Filed Oct. 28, 1975, Ser. No. 626,152

Int. Cl.² C07C 7/13

U.S. Cl. 260—674 SA 20 Claims

1. A process for separating para-xylene from a feed stream comprising para-xylene and at least one other C_8 aromatic isomer which process comprises the steps of:

a. contacting said feed stream at adsorption conditions with an adsorbent comprising type X or type Y zeolite containing barium and strontium in a weight ratio of barium to strontium of from about 1:1 to about 15:1 at the exchangeable cationic sites to effect the selective adsorption of para-xylene;

b. removing a raffinate component comprising a less selectively adsorbed C_8 aromatic from said adsorbent;

c. contacting said adsorbent with a desorbent material comprising para-diethylbenzene at desorption conditions to effect the desorption of para-xylene from said adsorbent; and,

d. removing from said adsorbent an extract component comprising para-xylene.

10. A process for the separation of para-xylene from a feed stream comprising para-xylene and at least one other C_8 aromatic isomer which process employs an adsorbent comprising type X or type Y zeolite containing barium and strontium in a weight ratio of barium to strontium of from 1:1 to about 15:1 at the exchangeable cation sites and which process comprises the steps of:

a. maintaining net fluid flow through a column of said adsorbent in a single direction, which column contains at least three zones having separate operational functions occurring therein and being serially interconnected with the terminal zones of said column connected to provide a continuous connection of said zones;

b. maintaining an adsorption zone in said column, said zone defined by the adsorbent located between a feed input stream at an upstream boundary of said zone and a raffinate output stream at a downstream boundary of said zone;

c. maintaining a purification zone immediately upstream from said adsorption zone, said purification zone defined by the adsorbent located between an extract output stream at an upstream boundary of said purification zone and said feed input stream at a downstream boundary of said purification zone;

d. maintaining a desorption zone immediately upstream from said purification zone, said desorption zone defined by the adsorbent located between a desorbent input stream at an upstream boundary of said zone and said extract output stream at a downstream boundary of said zone;

e. passing said feed stream into said adsorption zone at adsorption conditions to effect the selective adsorption of para-xylene by said adsorbent in said adsorption zone and withdrawing a raffinate output stream from said adsorption zone;

f. passing a desorbent material comprising para-diethylbenzene into said desorption zone at desorption conditions to effect the displacement of para-xylene from the adsorbent in said desorption zone;

g. withdrawing an extract stream comprising para-xylene and desorbent material from said desorption zone;

h. passing at least a portion of said extract output stream to a separation means and therein separating at separation conditions para-xylene from said desorbent material to produce a para-xylene product substantially free of desorbent material; and,

i. periodically advancing through said column of adsorbent in a downstream direction with respect to fluid flow in said adsorption zone the feed input stream, raffinate output stream, desorbent input stream, and extract out-

put stream to effect the shifting of zones through said adsorbent and the production of extract output and raffinate output streams.

3,997,621

CONTROLLED OLIGOMERIZATION OF OLEFINS

James A. Brennan, Cherry Hill, N.J., assignor to Mobil Oil Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 439,469, Feb. 4, 1974, abandoned, which is a continuation-in-part of Ser. No. 217,247, Jan. 17, 1972, Pat. No. 3,731,474. This application Mar. 17, 1975, Ser. No. 559,101

Int. Cl.² C07C 3/18

U.S. Cl. 260—683.15 B 5 Claims

1. In a process for preparing oligomers of aliphatic olefins having from about 6 to about 12 carbon atoms in the presence of boron fluoride promoted by a minor amount of alcohol or water, the improvement which comprises conducting the reaction at a temperature between about 0° C and about 60° C in the presence of a catalyst modifier which controls the reaction to reduce formation of oligomers higher than the trimer; said modifier being methyl or ethyl ester of a mono carboxylic acid having 2–5 carbon atoms in an amount of about 0.001 moles to about 0.075 moles of ester per mole of said alpha olefin.

3,997,622

METHOD FOR PREPARATION OF OLEFIN OLIGOMER

Hiroshi Isa; Toshiyuki Ukigai, both of Yachiyo; Anri Tominaga, Tokyo, and Michito Sato, Yokohama, all of Japan, assignors to Lion Fat & Oil Co., Ltd., Tokyo, Japan

Filed Jan. 26, 1976, Ser. No. 652,426

Claims priority, application Japan, Jan. 30, 1975, 50-11897

Int. Cl.² C07C 3/18

U.S. Cl. 260—683.15 B 5 Claims

1. A method of preparing an olefin oligomer by polymerizing an olefin or an olefin mixture having more than 6 carbon atoms, wherein said olefin or olefin mixture is to be polymerized in the presence of a catalyst mixture consisting of (a) polyhydric alcohol derivative obtained by substituting hydrogen atoms of the whole hydroxyl groups of polyhydric alcohol by either acyl group exclusively or acyl group and alkyl group, both said acyl group and alkyl group having 1 – 20 carbon atoms, (b) aluminum halide in an amount of 0.7 – 1.0 mole per each ester bond and ether bond possessed by said polyhydric alcohol derivative and (c) metallic aluminum powder.

3,997,623

METHOD FOR PREPARATION OF LIQUID OLEFIN POLYMERS

Hiroshi Isa; Toshiyuki Ukigai, both of Yachiyo; Anri Tominaga, Tokyo, and Michito Sato, Yokohama, all of Japan, assignors to Lion Fat & Oil Co., Ltd., Tokyo, Japan

Filed Nov. 21, 1975, Ser. No. 634,074

Claims priority, application Japan, Dec. 3, 1974, 49-138702

Int. Cl.² C07C 3/18

U.S. Cl. 260—683.15 B 6 Claims

1. A method of preparing liquid olefin polymers by subjecting an olefin having six or more carbon atoms to low-polymerization, wherein said olefin is to be polymerized in the presence of a mixture composed of a polyhydric alcohol derivative and an aluminum halide, said derivative being obtained by replacing hydrogen atoms of all the hydroxyl groups of the polyhydric alcohol either by acyl groups exclusively or by acyl groups and alkyl groups, both of said groups having 1 to 20 carbon atoms (in which mixture the amount of said aluminum halide is in the range of from 1.1 to 2.8 moles per 1 ester bond of said polyhydric alcohol derivative).

3,997,624

POLYETHYLENE WAXES

Donald E. Hudgin, Princeton Junction, N.J., assignor to Princeton Polymer Laboratories, Incorporated, Princeton, N.J.

Filed Oct. 1, 1975, Ser. No. 618,677

Int. Cl.² C07C 3/10

U.S. Cl. 260—683.15 R 27 Claims

1. A process of preparing an ethylene polymer wax having a molecular weight of 1,000 to 10,000 consisting essentially of polymerizing a member of the group consisting of (1) ethylene and (2) a mixture of ethylene with a copolymerizable monomer selected from the group consisting of vinyl acetate, acrylic acid, methacrylic acid, maleic anhydride and a copolymerizable alpha monoolefin, said monomers being present in an amount to provide not over 50 mol % of the polymer units, in the presence of a free radical forming catalyst having a 10-hour half life at 30° to 60° C., said polymerization being carried out at a temperature of 20° to 120° C. and a pressure of 300 to 900 psi and in an inert or chain transfer solvent having a molecular weight of not over 200 and selected from the group consisting of hydrocarbons, ethers, carboxylic acid esters and ketones and mixtures thereof.

3,997,625

HOT MELT ADHESIVE FOR METALS

Ken Ando, Nara; Yuichi Harada, and Yoshinobu Ohya, both of Amagasaki, all of Japan, assignors to Daicel, Ltd., Osaka, Japan

Continuation of Ser. No. 472,594, May 23, 1974, abandoned. This application Sept. 8, 1975, Ser. No. 611,208

Claims priority, application Japan, May 30, 1973, 48-60659

Int. Cl.² C08L 77/02

U.S. Cl. 260—857 L 2 Claims

1. A thermoplastic hot melt adhesive composition for bonding metals which consists essentially of a homogeneous mixture obtained by admixing and blending (A) 60 to 90 percent by weight of a copolymer of nylon 12; nylon 6; nylon 6-6, copolymerized in a weight ratio of 25–40; 25–40; 25–40, and (B) the balance is an ethylene/vinyl acetate copolymer containing 5 to 20 weight percent of vinyl acetate.

3,997,626

ANTISTATIC POLYAMIDE COMPOSITIONS

Klaus-Rüdiger Bernert; Eduard Radlmann, and Günther Nischk, all of Dormagen, Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

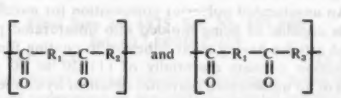
Continuation of Ser. No. 420,371, Nov. 30, 1973, abandoned. This application June 30, 1975, Ser. No. 591,633

Claims priority, application Germany, Dec. 2, 1972, 2259104

Int. Cl.² C08L 77/12

U.S. Cl. 260—857 TW 10 Claims

1. Antistatic polyamide composition consisting essentially of aliphatic polyamide and 1 – 30 percent by weight, based on the polyamide composition, of a polyester amide containing alkylated amide groups which has recurring structural units of both the general formulae

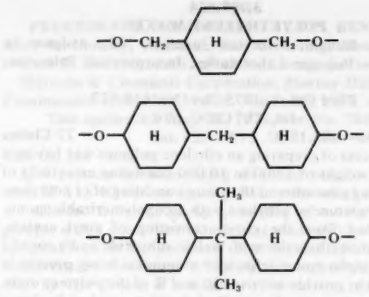


in statistical distribution,

wherein

R_1 represents a single bond, or a divalent radical containing up to 10 carbon atoms selected from the group consisting of a straight chain alkylene, branched chain alkylene, cycloalkylene group and arylene;

R_2 represents the groups —O—R_4—O—,



or the group of the general formula $-O-R_4-O-$ together with the group of the general formula

$$-(O-CH_2-CH_2)_y-NH-R_5-N-(CH_2-CH_2-O)_y- ;$$
$$\qquad\qquad\qquad\qquad\qquad\quad |$$
$$\qquad\qquad\qquad\qquad\qquad\quad R_6$$

wherein

R_4 represents a straight chain or branched chain alkylene group or a 1,4-cycloalkylene group; R_5 represents a straight chain or branched chain alkylene group containing 2 to 20 carbon atoms in which the chain may also contain tertiary nitrogen atoms;

R_6 represents a short chain straight or branched alkyl group containing 1 to 4 carbon atoms; z represents an integer of from 2 to 30 and y represents an integer of from 1 to 30;

R_3 represents a group of the general formula

$$-NH-R_5-N-$$
$$\qquad\quad |$$
$$\qquad\quad R_6$$

in which R_5 and R_6 have the meanings already indicated said polyester amides having relative solution viscosities η_{rel} in the range of 1.0 to 4.0 (measured on solutions of 1 g of substance in 100 ml of m-cresol at 25° C).

3,997,627

POLYESTER MOLDING COMPOSITIONS CONTAINING HYDROXY CONTAINING VINYL MONOMERS AND COATED MOLDED ARTICLES THEREOF

Yutaka Ichimura, Tokyo; Takahiro Kishino, Yokohama, and Naoyuki Fukahori, Kanagawa, all of Japan, assignors to Mitsubishi Rayon Co., Ltd., Tokyo, Japan

Filed Aug. 27, 1974, Ser. No. 500,858

Claims priority, application Japan, Aug. 29, 1973, 48-96088; Aug. 29, 1973, 48-96089; Sept. 19, 1973, 48-104910; Sept. 19, 1973, 48-104911

Int. Cl.[2] C08L *67/06*

U.S. Cl. 260—862 **5 Claims**

1. An unsaturated polyester composition for molding compounds capable of being molded into unsaturated polyester molded articles having good adhesion to coating film, which composition consists essentially of (1) 20 to 70 parts by weight of an unsaturated polyester obtained by condensing an acid component comprising predominantly an α, β-ethylenically unsaturated dicarboxylic acid with a polyol, (2) 25 to 75 parts by weight of a vinyl monomer copolymerizable with said unsaturated polyester (1), (3) 1 to 25 parts by weight of a thermoplastic polymer as a shirnkage-reducing agent (4) hydroxyl-group-containing vinyl monomers in a ratio of 1 to 40 parts by weight to 100 parts by weight of said unsaturated polyester (1), the sum of (1), (2), (3), and (4) being 100 parts by weight.

3,997,628

THERMALLY STABLE HIGH NITRILE RESINS AND METHOD FOR PRODUCING THE SAME

Brandford E. Giddings, Warrensville Heights, Ohio, assignor to Standard Oil Company, Cleveland, Ohio

Filed July 14, 1975, Ser. No. 595,376

Int. Cl.[2] C08L *51/00, 53/00, 33/00*

U.S. Cl. 260—876 R **6 Claims**

1. A polymer composition stable toward thermal discoloration containing from about 0.1 to about 1.5 parts by weight of the reaction product of maleic anhydride and polyvinyl alcohol wherein said polymer is composed of 100 parts by weight of the polymerization product of the monomers

A. at least 50% by weight of at least one nitrile having the structure

$$CH_2=C-CN$$
$$\qquad\quad |$$
$$\qquad\quad R$$

wherein R is hydrogen, a lower alkyl group having from 1 to 4 carbon atoms, or a halogen, and

B. up to 50% by weight based on the combined weight of (A) and (B) of at least one member selected from the group consisting of

1. styrene,
2. an ester having the structure

$$CH_2=C-COOR_2$$
$$\qquad\quad |$$
$$\qquad\quad R_1$$

wherein R_1 is hydrogen, an alkyl group having from 1 to 4 carbon atoms, or a halogen, and R_2 is an alkyl group having from 1 to 6 carbon atoms,

3. an alpha-olefin having the structure

$$\qquad\quad R'$$
$$\qquad\quad |$$
$$CH_2=C$$
$$\qquad\quad |$$
$$\qquad\quad R''$$

wherein R′ and R″ are alkyl groups having from 1 to 7 carbon atoms,

4. a vinyl ether selected from the group consisting of methyl vinyl ether, ethyl vinyl ether, the propyl vinyl ethers, and the butyl vinyl ethers, and
5. vinyl acetate, wherein said monomers are copolymerized in the presence of from 0 to 40 parts by weight of

C. a rubbery polymer of a conjugated diene monomer selected from the group consisting of butadiene and isoprene and optionally at least one comonomer selected from the group consisting of styrene, a nitrile monomer having the structure

$$CH_2=C-CN$$
$$\qquad\quad |$$
$$\qquad\quad R$$

wherein R has the foregoing designation, and an ester having the structure

$$CH_2=C-COOR_2$$
$$\qquad\quad |$$
$$\qquad\quad R_1$$

wherein R_1 and R_2 have the foregoing designations, said rubbery polymer containing from 50 to 100% by weight of polymerized conjugated diene and from 0 to 50% by weight of comonomer.

3,997,629

DYEABLE PROPYLENE POLYMER COMPOSITIONS

Ramchandra K. Hulyalkar, Oakland; Marvin Michael Fein, Westfield, both of N.J., and Jan Edmond Vandegaer, Pasadena, Md., assignors to Dart Industries Inc., Los Angeles, Calif.

Filed Dec. 29, 1975, Ser. No. 644,657
Int. Cl.² C08L 23/12
U.S. Cl. 260—897 B 6 Claims

1. A dyeable propylene polymer composition comprising

a. a propylene polymer and

b. from about 0.1 to about 10 percent by weight of an alternating copolymer of an alkyl vinyl ether and maleic anhydride based on the combined weight of the propylene polymer and the alternating copolymer, wherein the alkyl group of the alkyl vinyl ether contains at least 8 carbon atoms, and the mixture of (a) and (b) contains from about 0.4 to about 2.0 percent by weight of maleic anhydride groups derived from the alternating copolymer.

3,997,630

PROCESS FOR PREPARING METHYL ESTER OF O,O-DIMETHYL-DITHIOPHOSPHORYL ACETIC ACID

Mario Bornengo, and Saverio Grego, both of Mestre, Italy, assignors to Montedison Fibre S.p.A., Milan, Italy

Filed Mar. 20, 1975, Ser. No. 560,201
Claims priority, application Italy, Dec. 3, 1974, 30136/74
Int. Cl.² C07F 9/165
U.S. Cl. 260—979 3 Claims

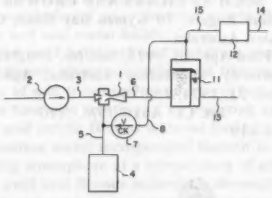
1. An improved continuous process for the preparation of the methyl ester of O,O-dimethyl-dithiophosphorylacetic acid, which comprises mixing an aqueous solution of the sodium salt of O,O-dimethyl-dithiophosphoric acid with the methyl ester of 2-chloroacetic acid at a pH of 5.5 to 7.0 at a temperature of from 80° C to 100° C allowing the reaction to proceed, for a reaction time of from 10 to 15 minutes, in absence of organic solvents, and stripping the methyl ester of O,O-dimethyl-dithiophosphorylacetic acid thus produced in a current of steam at a temperature of 60° C to 65° C, under a pressure of 140 to 150 mm Hg, and at a volumetric steam to ester ratio of 10:1 to 20:1.

3,997,631

GAS-LIQUID MIXING APPARATUS USING AN EJECTOR

Hiromasa Matsuoka, and Norikazu Tabata, both of Amagasaki, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 8, 1975, Ser. No. 603,146
Claims priority, application Japan, Aug. 29, 1974, 49-99264
Int. Cl.² B01F 3/04
U.S. Cl. 261—37 2 Claims



1. In a gas-liquid mixing apparatus comprising an ejector having an inlet for receiving a liquid for gas-liquid mixing and a gas feeder fluidically connected to said ejector by means of a pipe for feeding a gas into the ejector, the improvement comprising:

a valve fluidically connected to said pipe and disposed between an aspirating inlet of the ejector and the gas feeder,

said valve being connected to a gas source for supplying a second gas which does not adversely affect the purpose of the gas-liquid mixing operation being performed,

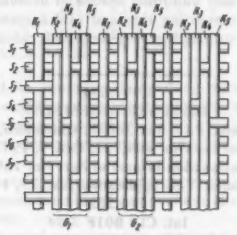
whereby the second gas from said gas source is fed to the aspirating inlet of said ejector when the pressure of the gas feeder decreases below a predetermined value.

3,997,632

MONOFIL FABRIC FOR USE AS A PERPENDICULAR TRICKLE WALL IN EXCHANGE COLUMNS

Hans-Joachim Kloss, Hilden, Germany, assignor to Julius Montz GmbH, Hilden, Germany

Division of Ser. No. 308,391, Nov. 21, 1972, abandoned. This application July 25, 1974, Ser. No. 491,898
Claims priority, application Germany, Nov. 24, 1971, 2158171
Int. Cl.² B01F 3/04
U.S. Cl. 261—103 7 Claims



1. In a column for vapor-liquid exchange a trickle wall in the form of a sheet-like material, which wall consists of a wire fabric arranged in a vertical plane, one part of the wires of said fabric being arranged vertically and parallel to one another, the other part of the wires of said fabric being arranged horizontally and parallel to each other, at least a part of said horizontally arranged wires being positioned contiguously and in touching contact to one another in groups, the vertical spacing between a group of contiguously positioned wires and the next group of said horizontal wires being at least about as great as the diameter of a wire of said next group of wires and greater than the spacing between individual horizontal wires in said group of wires, whereby when in use liquid accumulates at the junction of the horizontally running contiguously disposed wires, which liquid is distributed in the vertical spacing which separates the groups of contiguously positioned wires so as to avoid the formation of rivulets as said liquid descends vertically over said trickle wall.

3,997,633

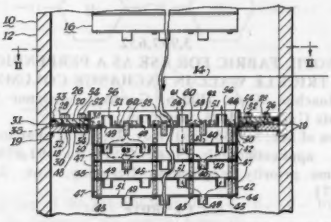
CONTACT TOWERS WITH LEAK-PROOF SUPPORT OF IMPROVED PLATE SUBASSEMBLY

Max Leva, One Hodgson Ave., Pittsburgh, Pa. 15205, and Joseph L. Leva, 1485 McFarland Road, Pittsburgh, Pa. 15216

Filed June 24, 1975, Ser. No. 589,906
Int. Cl.² B01D 47/12
U.S. Cl. 261—113 15 Claims

1. A gas-liquid contact tower comprising a tower shell, a plurality of superimposed generally horizontal contact plates within said tower shell, said plates being grouped into at least one subassembly thereof, supporting and sealing means for removably supporting said subassembly within said tower shell and for preventing any of said contact liquid from by-passing said subassembly, said supporting and sealing means including a supporting ring sealed to adjacent inner surfaces of said tower shell, a suspending ring detachably secured to said supporting ring and having an inner periphery projecting inwardly of said supporting ring, said subassembly having a

plate at one end thereof projecting radially outwardly of said subassembly, the radial projection thereof being detachably secured to the inward peripheral projection of said suspending ring, and annular gasket means inserted between said supporting ring and said suspending ring and between said suspending



ring and said radial plate projection, said gasketing means being substantially uniformly loaded at detachable junctions between said supporting ring and said suspending ring and between said suspending ring and said radial subassembly projection.

3,997,634

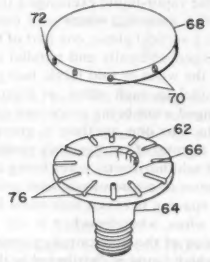
DIFFUSER ASSEMBLY

Ernest W. Downs, P.O. Box 30038, Cincinnati, Ohio 45230

Continuation of Ser. No. 404,722, Oct. 9, 1973, abandoned, which is a continuation-in-part of Ser. No. 160,721, July 8, 1971, abandoned. This application Jan. 27, 1975, Ser. No. 544,222

Int. Cl.² B01F *3/04*

U.S. Cl. 261—122 **11 Claims**



1. A diffuser assembly adapted to aerate a liquid medium within which it is immersed, comprising a first member having means at one end thereof for connecting to a source of aerating gas under pressure, and at the opposite end a face having a peripheral edge thereabout, said face being provided with a plurality of radially projecting slots, said first member having a gas pressure chamber communicating with said gas source, and a flexible cover engaging said peripheral edge and lying contiguous with said face, said cover being provided with a plurality of holes along the peripheral engaging portion of said cover such that each hole is aligned with one of the said slots.

3,997,635

METHOD AND DEVICE FOR EVAPORATIVE COOLING

Karl A. Hallgren, Huddinge, Sweden, assignor to Aktiebolaget Carl Munters, Sollentuna, Sweden

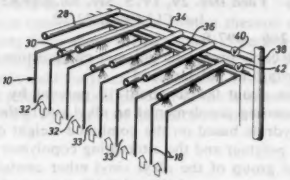
Filed Aug. 28, 1975, Ser. No. 608,694

Claims priority, application Sweden, Sept. 2, 1974, 7411088

Int. Cl.² F28C *1/02, 1/04*

U.S. Cl. 261—161 **7 Claims**

1. A method of evaporative cooling for use with an evaporative cooler consisting of a cooling tower including a multilayer contact body having gaps between the layers in which the formation of mist by condensation of vapor on return of the cooling air to the atmosphere is avoided; said method comprising the steps of supplying warm water to be cooled to a first group of the gaps in the contact body while supplying cooling air to substantially all of the gaps in the cooling body whereby the temperature and moisture content of air supplied to the gaps to which warm water is supplied are increased



while the temperature of the air supplied to the other gaps is increased by heat transfer through adjacent layers of the contact body without substantially changing the moisture content thereof; and then mixing the warmed air from said first group of gaps with air from gaps to which only air was supplied before discharging the air to the atmosphere.

3,997,636

PRILLING

Frank William Bennett, Woodbridge, England, assignor to Fisons Limited, London, England

Filed Feb. 13, 1975, Ser. No. 549,799

Claims priority, application United Kingdom, Feb. 15, 1974, 6893/74

Int. Cl.² B01J *2/16*

U.S. Cl. 264—7 **8 Claims**

1. In a process of prilling molten material in a cooling tower, comprising:

A. directing falling droplets of a molten material into a cooling tower containing a zone formed by an upward flow of a gas carrying suspended solid particles therein to cool and solidify the droplets and

B. collecting the solidified droplets at the bottom of the cooling tower;

the improvement wherein

C. said zone contains a mixture of coarse particles of a primary particle size of 5 to 150 micrometers and 0.1 to 10.0% by weight, based on the weight of the coarse particles, of fine particles having a primary particle size of less than 1 micrometer, said fine particles being made of a material different than that of the coarse particles, said fine particles functioning in the mixture by reducing the amount of coarse particles picked up by the molten material.

3,997,637

METHOD OF MAKING TOOTH RECONSTRUCTIONS SUCH AS INLAYS AND CROWNS

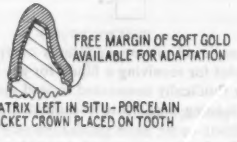
Olbert William Rogers, 70 Gymea Bay Road, Gymea, New South Wales, Australia

Filed Apr. 23, 1975, Ser. No. 570,740

Claims priority, application Australia, Apr. 29, 1974, 7387/74; Dec. 31, 1974, 150/74

Int. Cl.² A61C *13/8, 5/10*

U.S. Cl. 264—19 **5 Claims**



1. A method of making a porcelain and metal tooth recon-

struction, the metal being positioned with respect to the porcelain so as to be adapted to serve as a surface of contact with adhesive when the reconstruction is adhesively attached to a tooth, the method comprising:

forming a model of the reconstruction,

applying a conductive coating on said model,

electrolytically depositing a layer of a first metal selected from the group consisting of gold, platinum, palladium, rhodium and alloys thereof on said conductive coating,

removing said model from said layer of said first metal and forming a porcelain reconstruction having a desired shape against a surface of said metal, and then

electrolytically depositing on said layer of said first metal on a side opposite said porcelain, a second metal different from said first and selected from the group consisting of iron, tin, zinc, nickel, chromium, cobalt, vanadium, platinum and palladium.

3,997,638

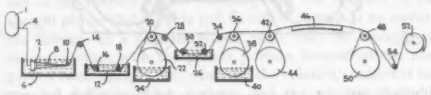
PRODUCTION OF METAL ION CONTAINING CARBON FIBERS USEFUL IN ELECTRON SHIELDING APPLICATIONS

Andrew J. Manning, Randolph Township; Lowell G. Saferstein, Piscataway, and Michael J. Ram, West Orange, all of N.J., assignors to Celanese Corporation, New York, N.Y.

Filed Sept. 18, 1974, Ser. No. 507,114

Int. Cl.² C01B *31/30*; C04B *25/46*

U.S. Cl. 264—29.7 **24 Claims**



1. An improved process for the production of a metal ion containing carbonaceous fibrous material wherein a metal nitride or a metal carbide is substantially uniformly dispersed in a carbon matrix capable of utilization in electron absorbing applications comprising:

a. forming an acrylic fibrous material selected from the group consisting essentially of an acrylonitrile homopolymer and acrylonitrile copolymers containing at least about 85 mole percent acrylonitrile units and up to about 15 mole percent of one or more monovinyl units copolymerized therewith having substantially uniformly dispersed therein a halide of a transition metal selected from the group consisting essentially of cobalt, hafnium, iron, molybdenum, nickel, niobium, tantalum, titanium, tungsten, uranium, vanadium, zirconium, and mixtures of the foregoing, with transition metal being provided in said fibrous material in a concentration of about 1 to 50 percent by weight based upon the total weight of said acrylic polymer and said metal halide,

b. converting said halide of said transition metal substantially uniformly dispersed within said fibrous material to an oxide of said transition metal by contact with a solution of a base or a solution of an oxidizing agent,

c. heating said acrylic fibrous material having said oxide of said transition metal incorporated therein in an oxygen-containing atmosphere at a temperature of about 220° to 300° C. until said fibrous material is thermally stabilized and rendered non-burning when subjected to an ordinary match flame, and

d. heating said resulting stabilized fibrous material having said oxide of said transition metal incorporated therein in an atmosphere selected from the group consisting essentially of nitrogen, argon, and helium provided at a temperature of about 1,100° to 3,000° C. for at least 15 seconds while retaining the original fibrous configuration substantially intact.

3,997,639

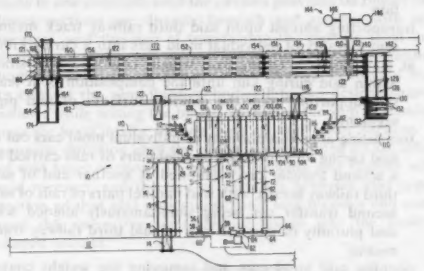
METHOD FOR WEIGHT COATING PIPE SEGMENTS

William R. Rochelle; Leroy N. Larenzo, and Eberhard V. Ranft, all of Houston, Tex., assignors to Brown & Root, Inc., Houston, Tex.

Continuation of Ser. No. 378,045, July 11, 1973, abandoned. This application June 30, 1975, Ser. No. 591,653

Int. Cl.² B28B *11/12*

U.S. Cl. 264—39 **1 Claim**



1. A method for continuously handling railway mold cars and molding a weight coating onto the exterior surface of pipe segments comprising the steps of:

providing first railway track means adjacent a pipe coating location;

coating a plurality of pipe segments to be weight coated with a corrosion resistant composition at said pipe coating location;

storing said coated pipe segments adjacent said first railway track means while said coating hardens; positioning individual, coated pipe segments to be weight coated into individual mold cars positioned end-to-end upon said first railway track means comprising a unitary pair of rails,

the mold cars being compatably dimensional with respect to the pipe segments so as to form voids between an exterior surface of the pipe segments and an interior surface of the mold cars;

translating from one end of the first railway track means a plurality of the individual mold cars and the contained pipe segments onto a first transfer car having a plurality of pairs of rail segments for supporting the plurality of individual mold cars, said translating including

positioning a first pair of rail segments of the first transfer car into longitudinal registry with the one end of the first railway track means,

moving one of the individual mold cars onto the first pair of rail segments of the first transfer car,

positioning at least a second pair of rail segments of the first transfer car into longitudinal registry with the one end of the first railway track means, and

moving at least another one of the individual mold cars onto at least a second pair of rail segments of the first transfer car;

transporting said first transfer car, including a plurality of individual mold cars and the pipe segments contained thereon which have been translated onto said first transfer car, upon a second railway track means extending transversely with respect to the first railway track means toward one end of a third railway track means comprising a plurality of pairs of mutually parallel sets of rails, said third railway track means extending longitudinally with respect to said first railway track means and transversely with respect to said second railway track means;

simultaneously aligning the pairs of rail segments of said first transfer car with respective pairs of rails of said third railway track means;

translating a plurality of individual mold cars and pipe segments contained thereon from said first transfer car and onto said one end of said third railway track means so

that said mold cars are disposed abreast of one another on respective pairs of rails of said third track means;

filling said voids between the exterior surfaces on the individual pipeline segments and the interior surfaces of said mold cars with a weight coating composition in a fluid state;

said filling of said voids being effected while said plurality of mold cars are disposed abreast at a void filling location on said third track means, with each mold car being separately operable to receive said weight coating composition;

transporting abreast upon said third railway track means, said plurality of individual mold cars into a curing kiln;

at least partially curing said weight coating composition within said curing kiln until the composition is at least self-supporting upon the exterior surfaces of said pipe segments;

translating abreast a plurality of individual mold cars out of said curing kiln and onto parallel pairs of rails carried by a second transfer car positioned at another end of said third railway means, with said parallel pairs of rails of said second transfer car being simultaneously aligned with said plurality of pairs of rails of said third railway track means;

opening said mold cars and removing the weight coated pipe segments therefrom so as to empty said mold cars;

said removing of said weight coated pipe segments being effected while said plurality of mold cars are disposed abreast, with each said mold cars being independently operable to permit said removal of a weight coated pipe segment;

simultaneously transferring said second transfer car and a plurality of empty mold cars mounted abreast thereupon along a fourth railway track means toward said first railway track means, with said fourth railway track means extending transversely with respect to the first and third railway track means;

cleaning said plurality of mold cars while said plurality of mold cars are disposed abreast in said fourth railway track means;

sequentially bringing said parallel pairs of rails of said second car into alignment with another end of the first railway track means; and

sequentially moving said empty mold cars into end-to-end relation on said first railway track means with said mold cars being then operable to receive further pipe segments to be weight coated.

3,997,640

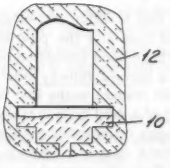
METHOD OF FORMING A SILICON NITRIDE ARTICLE

Jesse D. Walton, Jr., Atlanta, Ga., assignor to Ford Motor Company, Dearborn, Mich.

Filed Jan. 28, 1975, Ser. No. 544,718

Int. Cl.[2] B28B 1/26; B29C 1/08

U.S. Cl. 264—82 7 Claims



1. A method of forming an article of silicon nitride which comprises:

forming the shape of the article in a molding material, which molding material may be liquified;

forming a porous shell about said shaped molding material with a refractory ceramic material which loses its structural strength when heated;

removing said shaped molding material from the interior of said porous shell by liquifying said molding material;

casting a silicon metal slip into said porous shell to fill the volume created by removal of said molding material;

drying said porous shell and said silicon metal deposited therein by said slip casting step;

nitriding the silicon metal contained within said porous shell by heating said contained silicon metal in a nitrogen atmosphere to a temperature sufficient to allow the nitriding action, said nitriding temperature being sufficient to cause said porous shell to lose its structural strength and

removing said porous shell of weakened structural strength to produce the article of silicon nitride.

3,997,641

METHOD OF MANUFACTURING TIRE INNER TUBES

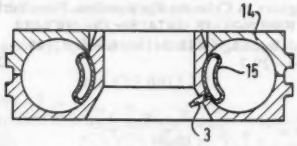
Eric Holroyd, High Legh Park, near Knutsford, and Anthony Gerald Goodfellow, Maghull, near Liverpool, both of England, assignors to Dunlop Limited, London, England

Filed July 8, 1974, Ser. No. 486,619

Claims priority, application United Kingdom, July 18, 1973, 34119/73

Int. Cl.[2] B29C 17/07; B29H 5/10

U.S. Cl. 264—89 9 Claims



1. A method for the manufacture of inner tubes for pneumatic tires comprising the following steps:

a. moulding the tire in two annular parts from uncured rubber which has been mechanically worked so as to destroy its nerve or memory,

b. bringing the two parts together under pressure whilst the rubber is in the worked condition and at a temperature below that at which rapid cure takes place to form a tube having circumferential joints,

c. stretching the tube to a desired internal diameter whilst still not completely cured by applying forces parallel to the direction of said joints and placing the tube in a mould having a toroidal shaped cavity of corresponding internal diameter,

d. inflating the tube in the mould to the shape of said cavity and effecting final cure of the rubber by the application of heat.

3,997,642

METHOD FOR TRANSFERRING AND HEATING A DEFORMED AND ONE-SIDED WALL-THICKNESS PARISON

Shinsuke Yoshikawa; Yuji Sawa, and Takeshi Nakadai, all of Iwaki, Japan, assignors to Kureha Kagaku Kogyo Kabushiki Kaisha and Mitsui Toatsu Chemicals, Incorporated, both of Tokyo, Japan

Filed Dec. 27, 1974, Ser. No. 537,001

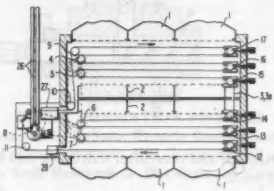
Claims priority, application Japan, Dec. 27, 1973, 48-144515

Int. Cl.[2] B29C 17/07

U.S. Cl. 264—98 1 Claim

1. In a blow molding method for transferring and heating deformed and one-sided wall-thickness parisons in which each heated parison is expanded in conformity with a mold after being stretched in a parison stretching device or just after being heated with the use of a conveying device provided with

a number of upright pins on which parisons are respectively insertably mounted and adapted for continuous travel within a furnace while being rotated themselves, the inner wall of each parison being irregular, each upright pin having a section, which fits the inner wall of a parison at the lower part thereof and including a planar portion placed into sliding contact with a guide rail provided at an outlet of the furnace in order to relatively position each parison, the improvement comprising: the steps of transferring each upright pin after a parison has been insertably mounted thereon across the furnace while the rotation of the upright pin is stopped for a time by lightly holding the top of each parison by an inverted funnel type guide funnel, during the light holding, rotating a positioning piece fitted within the upper inner wall of the parison so that



the positioning piece moves downward to properly fit the piece within the parison and then positions the parison on the upright pin, subsequently upwardly retracting the guide funnel and positioning piece, causing each parison to rotate again prior to being again reversely transferred across and heated within the heating furnace, and when each parison is moved out of the furnace, again stopping only the rotation of each upright pin so that a guide rail fixedly mounted at an outlet of the furnace at a predetermined angle may be brought into sliding contact with the planar portion formed at the lower part of each upright pin, whereby the relative positional relationship between each parison and the parison stretching device or the relative positional relationship between each parison and the mold coincides.

3,997,643

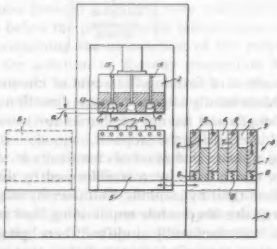
METHOD OF MAKING SHAPED ARTICLES

Edmund Munk, and Herbert Haas, both of Oberstenfeld, Germany, assignors to Furnier-und Sperrholzwerk J. F. Werz Jr. KG Werzalit - Pressholzwerk, Oberstenfeld, Germany

Division of Ser. No. 547,448, Feb. 5, 1975. This application Sept. 12, 1975, Ser. No. 613,029

Int. Cl.² B29G *1/00*

U.S. Cl. 264—120 **9 Claims**



1. A method of making shaped articles from a mixture of fibrous material with a thermosetting binder using a molding apparatus of the type including an upper mold section having a plurality of recesses on a lower surface thereof, and a pair of lower mold sections mounted below said upper section for simultaneous reciprocating movement between respective positions in each of which said lower sections are respectively directly beneath and laterally offset from said upper section, each of said lower sections having a respective upper surface facing said lower surface of said upper section which is respectively provided with a plurality of mixture-filling cavities and mixture-compacting projections, the method comprising the steps of cold-pressing the mixture in said cavities in unheated state at a working station to convert the mixture into a plurality of semi-finished bodies having approximately the shape and size of the desired shaped article, including the step of horizontally simultaneously shifting both of said lower sections in one direction until the cavities provided on one of said lower sections are directly beneath and register with said recesses, and the step of transferring the mixture from said cavities to said recesses; and hot-pressing the semi-finished bodies at said same working station upon application of heat to convert the semi-finished bodies into the desired shaped articles while setting the binder, including the step of simultaneously horizontally shifting both of said lower sections in opposite direction until the projections provided on the other of said lower sections are directly beneath and register with said recesses, and the step of vertically lowering said upper section so that said projections enter said recesses and compact the respective semi-finished bodies into the desired shaped articles.

3,997,644

METHOD FOR MANUFACTURING NOVEL CATION EXCHANGERS

Takezo Sano, Takatsuki; Akira Kobayashi, Ibaragi, and Ichiki Murase, Tokyo, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Filed Sept. 16, 1974, Ser. No. 506,023

Claims priority, application Japan, Sept. 19, 1973, 48-106223

Int. Cl.² C08J *1/34*

U.S. Cl. 264—122 **3 Claims**

1. A method for manufacturing a cation exchanger, which comprises

blending polyethylene fibers having sulfur content of 2 to 20% by weight, into which sulfonic groups have been introduced, with thermoplastic resin fibers which are at least one member selected from the group consisting of polyethylene fibers, polypropylene fibers and polystyrene fibers in pulp form, wherein 0.1 to 50% by weight of the thermoplastic resin fibers is blended on the basis of total fibers,

forming the resulting blend into a fibrous sheet in water or methanol, and

treating the sheet at a temperature which is at least the softening point of said thermoplastic resin fibers.

3,997,645

METHOD OF ROTATIONAL MOLDING A RECTANGULAR MAT

William Boyd Dempster, Kettering, England, assignor to Canathane Roller Corporation, Downsview, Canada

Filed Oct. 8, 1974, Ser. No. 513,185

Int. Cl.² B29C *5/04*

U.S. Cl. 264—163 **7 Claims**

1. A method of manufacturing a cover intended to be wrapped around the curved surface of a cylindrical magnetic former to produce a roller for use in the application of coatings to sheet material, the method comprising the steps of:

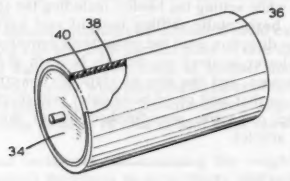
providing a hollow cylindrical drum which is rotatable about a generally horizontal axis, the drum having a continuous cylindrical inner surface defining an open cylindrical cavity;

rotating the drum about said generally horizontal axis;

centrifugally casting an outer hollow cylindrical layer of said cover by introducing into said cavity of the rotating drum, a castable material which is selected from the group consisting of liquid polymeric systems and liquid

prepolymeric systems capable of being molded and cured to solid macromolecular structures having elastomeric properties, and allowing said material to flow under the effect of centrifugal force to form on said inner surface of the drum a continuous hollow cylindrical layer of substantially uniform thickness;

after said layer has at least partly cured, centrifugally casting onto its inner surface an inner layer of said cover by introducing into said cavity of the drum, a castable material which is selected from said group, is capable of bonding with the outer layer, and which has particles of a magnetic material dispersed therein, the proportion and dimensions of the said particles being such as to ensure film adhesion of the resulting cover to a magnetic former



in use, and allowing the material of said inner layer to flow under the effect of centrifugal force to form on said layer a continuous hollow cylindrical inner layer of substantially uniform thickness, containing said particles of magnetic material;

allowing said inner layer to partially cure so the resulting mat can be handled;

cutting said layers from end to end while said layers are in said cavity to facilitate removal of said layers and form a rectangular mat which can be wrapped around the curved surface of a cylindrical magnetic former;

removing said mat from said cavity of the drum;

and

fully curing said layers outside said cavity.

3,997,646

PROCESS FOR THE PRODUCTION OF POLYAMIDE MOULDINGS

Kurt Schneider; Helmut Vogel, both of Krefeld; Wolfgang Meyer, Rheinhausen, and Bert Brassat, Krefeld, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

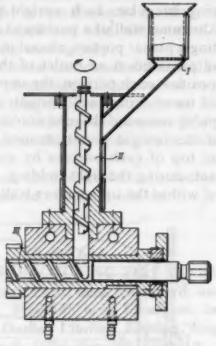
Continuation of Ser. No. 282,102, Aug. 21, 1972, abandoned. This application May 21, 1974, Ser. No. 472,054

Claims priority, application Germany, Aug. 21, 1971, 2141986

Int. Cl.[2] B29B *5/04;* **B29F** *1/04, 3/02*

U.S. Cl. 264—176 R **2 Claims**

1. In an improved process for the production of polyamide mouldings by activated, anionic polymerization of lactams having at least five ring members by means of screw injection-moulding machines and screw extruders, the improvement which comprises: (1) partially polymerizing the lactam melt containing an activator and a catalyst in a stirrer unit while continuously stirring at a temperature of 100° to 250° C, up to a relative viscosity of at least 1.4, measured at 25° C on a 1% by weight solution of the polyamide in cresol; (2) delivering the resultant prepolymerized melt into the feed zone of the screw injection moulding machine or of a screw extruder without applying pressure; (3) transporting the melt into the polymerization part of said machine or extruder by means of a screw at a temperature of from 100° to 300° C; and completing polymerization and thereafter extruding and molding said polymerized melt.



3,997,647

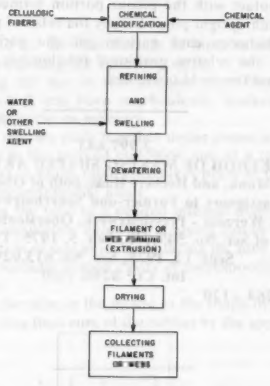
METHOD OF MAKING FILAMENTS AND WEBS OF CHEMICALLY MODIFIED CELLULOSE FIBERS

Frederick O. Lassen, Neenah, Wis., assignor to Kimberly-Clark Corporation, Neenah, Wis.

Continuation of Ser. No. 402,311, Oct. 1, 1973. This application Feb. 24, 1975, Ser. No. 552,230

Int. Cl.[2] D01D *5/08;* **D01F** *2/00*

U.S. Cl. 264—178 F **16 Claims**



1. A method of forming filaments of chemically modified fibers predominantly aligned along a direction parallel to the filament length and having capillaries for transporting aqueous liquid comprising the steps of,

forming a plasticized mass of chemically modified cellulose fibers which have been transformed by derivatization to increase their hydrophilic character by mixing with water to swell the fibers while maintaining their individual identities; said chemically modified fibers being selected from the group consisting of, (a) cellulose that has been chemically substituted by etherization or esterification, (b) cellulose that has been chemically substituted by etherization or esterification and cross-linked, and (c) cellulose that has been polymeric grafted,

removing unbound water while maintaining sufficient water content within the fibers to maintain their swollen condition forming plasticized extrudate;

extruding the extrudate through an orifice having a diameter of about 0.005 to 0.060 inch to align and interbond the individual fibers to form a filament that is about 85–99% water by weight; and

drying the filament to a water content of less than 10%.

3,997,648

FIBRIL FORMATION PROCESS

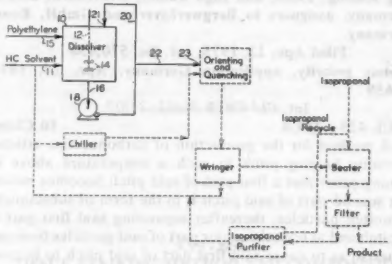
Joseph Calvin Davis, DeSoto; Francis Ross Galiano, Overland Park, and Robert William Hill, Leawood, all of Kans., assignors to Gulf Research & Development Company, Pittsburgh, Pa.

Filed Jan. 3, 1972, Ser. No. 214,925

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 9, 1976

Int. Cl.² B02C *18/00*

U.S. Cl. 264—140 **2 Claims**



1. In a process for producing fibrils from a high molecular weight polymer which are readily suitable for incorporation in the paper-making process, including the steps of dissolving at an elevated temperature an olefin polymer having an inherent viscosity of at least 3.5 in a hot hydrocarbon solvent to obtain a hot polyolefin solution, shearing the hot polyolefin solution to thereby orient the polymer molecules therein, passing the sheared solution through a cooling zone maintained at a temperature well below the precipitation temperature of the solution while maintaining the orientation of the polymer molecules within the solution to thereby precipitate by thermal means the polymer solute of the solution in the form of a solvent swollen fibrous strand, separating a substantial portion of the polymer solvent from the fibrous strand, chopping and then beating the chopped fibrous strand in a liquid which is a nonsolvent for the polymer and which is soluble in the polymer solvent for a time sufficient to break down the fibrous strand into a plurality of fibrils, and separating the fibrils from the nonsolvent liquid, the improvement consisting of the step of homogenizing said hot polyolefin/hydrocarbon solvent solution by passing said hot polyolefin/hydrocarbon solvent solution through a device imposing a high shear on said solution to thereby remove any small, invisible globules of partially dissolved polyolefin that may be present in said solution prior to the fibril formation steps of the process whereby paper sheets fabricated from the resultant fibrils are free of small knots and lumps and possess a completely smooth surface.

3,997,649

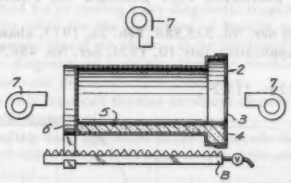
METHOD OF ROTATIONAL MOLDING A HOLLOW ARTICLE

Stewart Pivar, Muttontown, N.Y., assignor to Rototron Corporation, Farmingdale, N.Y.

Continuation-in-part of Ser. No. 84,503, Oct. 27, 1970, Pat. No. 3,703,348, which is a continuation of Ser. No. 724,802, April 29, 1968, abandoned. This application Nov. 29, 1971, Ser. No. 202,976

Int. Cl.² B29C *5/04*

U.S. Cl. 264—310 **13 Claims**



1. The method for molding a hollow plastics article, comprising: introducing a substantial part of a fusible powdered plastics charge into a rotary mold, said mold having an opening in an end thereof symmetrical with respect to said end, said mold end having an annular retaining ring secured thereto partially closing said open end, an opening in said annular ring providing access to the interior of said mold and an exit for said article from said mold, said plastics charge and said article being such that said article is removable through said opening, rotating said mold about a horizontal axis of rotation about which said opening is symmetrically disposed, heating said mold, with the mold interior communicating horizontally with ambient atmosphere through said opening while said mold is rotating, to fuse the plastics charge in the mold and distribute said charge on the interior surface of said mold, heating said charge only through walls of said mold; cooling said mold and the charge therein, to form said article, by simultaneously blowing cooling air on the mold outer walls and through said opening into the mold interior and removing said article from the mold through said opening.

3,997,650

PROCESS FOR EXTRACTING ALUMINA FROM ALUMINA-CONTAINING ORES

Koichi Yamada; Masao Yoshihara, and Takahiro Ishida, all of Niihama, Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Filed Sept. 8, 1975, Ser. No. 611,155

Claims priority, application Japan, Sept. 28, 1974, 49-111903

Int. Cl.² C01F *7/06*

U.S. Cl. 423—119 **12 Claims**

1. In a process for extracting alumina from alumina-containing ores by individually preheating a slurry of alumina-containing ores in alkali solution, and an alkali solution, and feeding the preheated slurry and the preheated alkali solution to a digester maintained at a temperature of about 200° to about 300° C, thereby extracting alumina from the alumina-containing ores, the improvement which comprises preparing from the alumina-containing ores and the alkali solution a slurry having a molor ratio of Na_2O/Al_2O_3 of not more than 1, adding an alkali material, which comprises recycled decomposition solution, extracted slurry or alkali solution from outside the extracting process, to the slurry while preheating the slurry before the slurry reaches a temperature of forming scales originating from deposition of boehmite-type alumina from the slurry, thereby obtaining the slurry having an adjusted molar ratio of Na_2O/Al_2O_3 of more than 1, further preheating the slurry having the adjusted molar ratio to a temperature higher than that of forming scales originating from deposition

of boehmite-type alumina from the slurry before the adjustment of the molar ratio, and then feeding the preheated slurry and a separately preheated alkali solution to the digester, thereby extracting the alumina from the alumina-containing ores in the slurry.

3,997,651

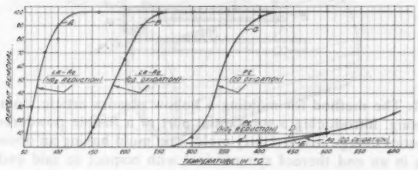
CATALYST MATERIAL, METHOD OF PREPARATION THEREOF, AND METHOD AND APPARATUS USING SAME

Carlo V. Bocciarelli, 1329 Lombard St., Philadelphia, Pa. 19147

Division of Ser. No. 335,588, Feb. 26, 1973, abandoned. This application July 10, 1974, Ser. No. 486,985

Int. Cl.² B01D *53/00*

U.S. Cl. 423—213.2 **3 Claims**



1. A method for decreasing the quantity of CO and NO_2 in the exhaust emissions from an engine by reducing NO_2 and oxidizing CO, comprising the steps of placing in the path of said emissions a catalyst alloy material consisting essentially of lanthanum distributed in elemental form in a carrier metal of silver, while maintaining said catalyst material at a temperature for which it is catalytically active.

3,997,652

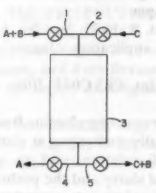
SELECTIVE CHROMATOGRAPHIC SEPARATION

Aaron J. Teller, Westboro, Mass., assignor to Teller Environmental Systems, Inc., Worcester, Mass.

Division of Ser. No. 156,952, June 25, 1971, Pat. No. 3,859,417, which is a continuation of Ser. No. 860,665, Sept. 24, 1969, abandoned, which is a continuation-in-part of Ser. No. 667,801, Sept. 14, 1967, abandoned, which is a continuation-in-part of Ser. No. 363,403, April 29, 1964, abandoned. This application June 14, 1974, Ser. No. 479,214

Int. Cl.² B01D *53/34*

U.S. Cl. 423—341 **6 Claims**



1. A process for the vapor phase chromatographic separation of hydrogen fluoride from a gas stream comprising the steps of:

a. passing said gas stream at a temperature of about 120°–130° F. into contact with an absorbent, high surface area solid support material having an extended surface area in the range of 100–300 m^2/gm. of material and having deposited thereon about 2–25 parts per 100 parts by weight of sodium fluoride to form a thermally decomposible molecule and thereby removing hydrogen fluoride from the gas stream;

b. recovering said gas stream substantially free of hydrogen fluoride by removing it from contact with the support material and the thermally decomposible molecule deposited thereon; and,

c. regenerating the sodium fluoride for reuse by raising the temperature of said support material and the thermally decomposible molecule deposited thereon to a temperature of about 240° F. until substantially all of the hydrogen fluoride is driven off and recovered.

3,997,653

PROCESS FOR THE MANUFACTURE OF CYANOGEN

Wilhelm Riemenschneider, Frankfurt am Main, and Peter Wegener, Schneidhain, Taunus, both of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed June 4, 1975, Ser. No. 583,516

Claims priority, application Germany, June 6, 1974, 2427268; Mar. 18, 1975, 2511715

Int. Cl.² C01C *3/00*

U.S. Cl. 423—384 **12 Claims**

1. A process for the manufacture of cyanogen which comprises catalytically oxidizing hydrogen cyanide with oxygen in an aliphatic ether or a nitrile selected from the group consisting of acetonitrile, propionitrile, their homologs and benzonitrile containing from 0 to 20 weight % of water and at least 0.01 mole/l of $Cu(NO_3)_2$.

3,997,654

METHOD FOR THE PRODUCTION OF CARBONACEOUS ARTICLES, PARTICULARLY STRANDS

Georg Kölling, Essen, and Ingo Romey, Drevenack, both of Germany, assignors to Bergwerksverband GmbH, Essen, Germany

Filed Apr. 22, 1975, Ser. No. 570,458

Claims priority, application Germany, Apr. 24, 1974, 2419659

Int. Cl.² C01B *31/02, 31/07*

U.S. Cl. 423—447.4 **10 Claims**

1. A method for the production of carbonaceous articles, comprising heating pitch to such a temperature above its softening point that a first part of said pitch becomes molten and a second part of said pitch is in the form of substantially non-molten particles; thereafter separating said first part of said pitch and at least the major part of said particles from one another so as to cause said first part of said pitch to become more homogeneous; treating said first part of said pitch so as to increase the molecular weight thereof; shaping said first part of said pitch subsequent to said separation and said treatment so as to form at least one article therefrom; contacting said article with finely divided activated carbon which is impregnated with an oxidizing agent; oxidizing said article in the presence of said activated carbon so as to increase the melt-resistance of said article; and carbonizing said article.

3,997,655

PROCESS FOR CATALYTICALLY REACTING GASES HAVING A HIGH SO_2 CONTENT

Lothar Reh, Bergen-Enkheim; Karl-Heinz Dörr, Mainz; Hugo Grimm, Frankfurt am Main, and Karel Vydra, Bad Nauheim, all of Germany, assignors to Metallgesellschaft Aktiengesellschaft, Frankfurt am Main, Germany

Continuation of Ser. No. 343,619, March 21, 1973, abandoned. This application Sept. 30, 1975, Ser. No. 618,192

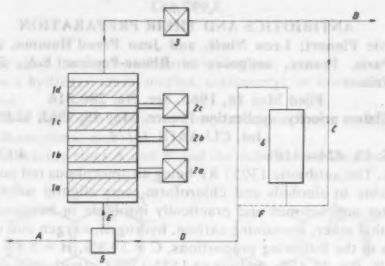
Claims priority, application Germany, Mar. 21, 1972, 2213579

Int. Cl.² C01B *17/76*

U.S. Cl. 423—533 **1 Claim**

1. In a process for the production of sulfur trioxide by the catalytic oxidation of a feed gas having a sulfur dioxide content of more than 11% in a contacting zone having a plurality of series-connected contacting trays wherein the reaction is interrupted before reaching the temperature at which the catalyst deteriorates and wherein a stream containing sulfur

trioxide is supplied to the contacting zone, and the gases are subjected to interstage cooling between contacting trays, the improvement for controlling the amount of sulfur trioxide supplied to the contacting zone in dependence on catalyst activity which comprises branching off a partly reacted gas stream containing sulfur dioxide and sulfur trioxide from the



contacting zone effluent, passing said branched-off stream to a sulfur trioxide absorber zone and increasing the rate at which SO_3 is absorbed in dependence on the increase in loss in catalyst activity such that the conversion of SO_2 to SO_3 in the contacting trays remains approximately constant, and admixing the effluent stream from the absorber zone with said feed gas before entering the first contacting tray.

3,997,656

TISSUE STAINING METHOD AND COMPOSITION

Paul T. Wertlake, Los Angeles, Calif., and James S. Harrison, Ringwood, N.J., assignors to Applied Bioscience, Fairfield, N.J.

Continuation-in-part of Ser. No. 373,276, June 25, 1973, abandoned, which is a continuation-in-part of Ser. No. 338,732, March 7, 1973, Pat. No. 3,862,300. This application July 15, 1975, Ser. No. 596,010

The portion of the term of this patent subsequent to Jan. 21, 1992, has been disclaimed.

Int. Cl.² A01N *1/02*; G01N *1/00*

U.S. Cl. 424—3 **21 Claims**

1. A method of staining tissue for microscopic examination which comprises (a) immersing frozen tissue in an aqueous solution comprising from about 1 to about 50% wt/vol. of a mixture of trichloroacetic acid, zinc chloride and formaldehyde wherein said mixture contains from about 5% to about 85%, by weight of said mixture, of trichloroacetic acid, from about 4% to about 30%, by weight of said mixture, of zinc chloride and from about 3% to about 70%, of by weight of said mixture, of formaldehyde, and (b) thereafter immersing the tissue at least once in an aqueous solution comprising 0.1 to 2% hematoxylin until staining of said tissue is complete.

9. A histological fixative composition comprising a solution of (a) a mixture of from about 5% to about 85%, by weight, of trichloroacetic acid, from about 4% to about 30%, by weight, of zinc chloride, and from about 3% to about 70%, by weight, of 100% formaldehyde, in (b) an aqueous medium, the concentration of said mixture in said solution being from about 1% to about 50%, wt/vol.

3,997,657

DRY SLIDE REAGENT EMPLOYED IN IMMUNOFLUORESCENT TEST FOR DETECTION OF HUMAN ANTINUCLEAR FACTOR

Beatrice Frances Dziobkowski, Burlington, Vt., and Gerald Earl Stiles, W. Nyack, N.Y., assignors to American Cyanamid Company, Stamford, Conn.

Division of Ser. No. 406,439, Oct. 15, 1973, abandoned. This application Dec. 3, 1975, Ser. No. 637,270

Int. Cl.² G01N *1/00, 21/52, 31/22*

U.S. Cl. 424—3 **4 Claims**

1. A method for preparing a dry diagnostic reagent fixed on a microscope slide for the detection of human antinuclear factor in human serum or plasma in an immunofluorescent test for the diagnosis of systemic lupus erythematosus and other autoimmune diseases which comprises:

a. sieving only fetal calf thymus to obtain dispersed thymocyte cells therefrom;

b. suspending said dispersed thymocyte cells in isotonic buffered saline solution to a cell count of about 1.0–1.5 × 10^6 cells/ml.;

c. placing at least one portion of about 0.05 ml. of said dispersed thymocyte cell suspension on a microscopic slide;

d. drying said amount of said dispersed thymocyte cell suspension on said slide;

e. fixing said dried cell suspension with modified Carnoy's solution;

f. washing said fixed suspension with water; and

g. drying said fixed and washed suspension.

2. The method of claim 1 including the additional step of placing said dried, fixed and washed slide in an air tight container with dessicant.

3,997,658

DENTAL PLAQUE DISCLOSING COMPOSITIONS

Philip L. Block, SRA Box 34L, Anchorage, Alaska 99507, and John P. Derdivanis, 6284 Crown Ave., Oakland, Calif. 94600

Continuation of Ser. No. 343,764, March 22, 1973, abandoned, which is a division of Ser. No. 109,054, Jan. 22, 1971, Pat. No. 3,723,613. This application June 5, 1975, Ser. No. 584,224

Int. Cl.² A61K *29/00*; G01N *21/02, 21/16*

U.S. Cl. 424—7 **5 Claims**

1. A composition in the form of an aqueous solution, aerosol spray, chewable tablet, wafer or lozenge for application to the oral cavity for accomplishing the differential disclosure of dental plaque, said composition consisting essentially of FDC Red. No. 3 and FDC Green No. 3, said FDC Green No. 3 being present in from about 0.1 to 4 parts by weight for each part by weight of the FDC Red No. 3, said composition differentially staining areas of old, thick accumulation of dental plaque blue and thin, recent deposits of dental plaque red, whereby effectively practiced plaque removal on a given tooth shows, and can be photographed, as either no stain pickup or thin deposits staining red, while certain areas on said tooth if consistently missed, will be considerably thicker and therefore stained blue, and on some teeth, an intermediate definite purple zone can be distinguished between the red and blue areas, said intermediate definite purple area tending to look more like blue plaque than red plaque, but the thickness of this purple plaque being less than that of blue plaque, while tooth surfaces not covered with plaque do not show the dye at all.

3,997,659

HAIR BLEACHING COMPOSITIONS CONTAINING AN ARGININE COMPOUND

Richard B. Knohl, and Eugene Zeffren, both of Wyoming, Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Continuation of Ser. No. 129,554, March 30, 1971, abandoned. This application Apr. 26, 1974, Ser. No. 464,593

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 9, 1976

Int. Cl.[2] A61K *7/135*

U.S. Cl. 424—62 **5 Claims**

1. A hair bleaching composition comprising: (1) from about 0.1 to about 20% by weight of an arginine compound selected from the group consisting of arginine, arginine carbonate, arginine chloride, and arginine phosphate; (2) from about 1 to about 10% by weight of a water-soluble peroxide compound; and (3) from about 1 to about 10% by weight of a water-soluble hair bleaching accelerator selected from the group consisting of ammonium peroxydisulfate, alkali metal peroxydisulfate, ammonium peroxydiphosphate, alkali metal peroxydiphosphate, and mixtures thereof, said composition having a pH of from about 8 to about 11 in aqueous solution.

3,997,660

SOLUBLE HYDROPHILIC POLYMERS AND PROCESS FOR PRODUCING THE SAME

Jinrich Kopecek; Jiri Vacik, both of Prague, and Ladislav Sprincl, Prague-Stodulky, all of Czechoslovakia, assignors to Ceskoslovenska akademie ved, Prague, Czechoslovakia

Division of Ser. No. 335,748, Feb. 26, 1973, Pat. No. 3,931,111. This application Apr. 25, 1974, Ser. No. 464,033

Claims priority, application Czechoslovakia, Feb. 29, 1972, 1333/72

Int. Cl.[2] A61K *31/74, 31/78, 9/70*

U.S. Cl. 424—78 **5 Claims**

1. A solution for use as a blood plasma substitute or cosmetic or medicinal carrier comprising, in a physiological saline solution, a water soluble low molecular weight polymer comprising the polymerizate of at least one monomer selected from the group consisting of N-alkyl methacrylamides, N-hydroxyalkyl methacrylamides, N-alkyl acrylamides, N-hydroxyalkyl acrylamides, N,N-dialkyl acrylamides, and mono-esters of acrylic and methacrylic acids with di-, tri- and higher homologous polyethlene glycols wherein the alkyl radicals are selected from the group consisting of unsubstituted and substituted alkyl radicals, the substituents being selected from the group consisting of hydroxy, amino and alkoxy groups, said low molecular weight polymer having an average molecular weight in a range of 10,000 to 60,000 and containing up to 1% maximum of a fraction having a molecular weight above 100,000, said low molecular weight polymer being condensed with at least one bifunctional compound selected from the group consisting of diisocyanates, halides of dicarboxylic acids, phosgene and dialdehydes derived from dicarboxylic acids to form a condensation polymer having a molecular weight in a range of 60,000, to 240,000 and having cleavable cross-links.

3,997,661

PROCESS FOR THE PREPARATION OF DAUNORUBICIN BY CULTIVATING A STREPTOMYCES SPECIES

Denise Mancy, Charenton; Leon Ninet, and Jean Preud'Homme, both of Paris, all of France, assignors to Rhone-Poulenc S.A., Paris, France

Filed Nov. 14, 1968, Ser. No. 775,904

Claims priority, application France, Nov. 15, 1967, 67.128323

Int. Cl. A61k *21/00*

U.S. Cl. 424—118 **12 Claims**

1. Process for the production of daunorubicin which comprises aerobically cultivating *Streptomyces griseus, var. rubidofaciens*, DS 32,041, in an aqueous nutrient medium containing assimilable sources of carbon, nitrogen and inorganic substances, until sufficient amount of the antibiotic is produced and separating daunorubicin formed during the culture.

3,997,662

ANTIBIOTICS AND THEIR PREPARATION

Sylvie Pinnert; Leon Ninet, and Jean Preud'Homme, all of Paris, France, assignors to Rhone-Poulenc S.A., Paris, France

Filed May 16, 1963, Ser. No. 280,816

Claims priority, application France, May 18, 1962, 62.898076

Int. Cl.[2] A61K *35/74*

U.S. Cl. 424—119 **4 Claims**

1. The antibiotic 13057 RP being an amorphous red powder soluble in alcohols and chloroform, very slightly soluble in water and ketones and practically insoluble in benzene and diethyl ether; containing carbon, hydrogen, oxygen and nitrogen in the following proportions, C = 59.8%, H = 5.8%, N = 2.3%, 0 = 29.45%; melting at 155°–170° C. (with decomposition); having an ultra-violet spectrum (as determined on a solution of 96% ethanol) showing absorption maxima at 236 mμ, E_1 cm. 1% = 621, 255 mμ, E_1cm. 1% = 426, 290–295 mμ, E_1cm.1% = 135, and 482–498 mμ, $E_{1\,cm.}$1% = 230, and absorption minima at 245 mμ, E_1 cm.1% = 378, 280 mμ, E_1 cm.1% = 122, and 325 mμ, $E_{1\,cm.}$ 1% = 10, and a shoulder at 533 mμ, $E_{1\,cm.}$1% = 127; and having an infra-red spectrum (as determined on tablets in mixture with potassium bromide) showing the following principal absorption bands: about 3450 very strong, 295 strong, 1715 medium, 1615 strong, 1582 strong, 1447 strong, 1410 strong, 1380 strong, 1355 strong, 1282 strong, 1262 shoulder, 1230 strong, 1205 strong, about 1190 shoulder, 1150 shoulder, 1117 strong, 1090 medium. 1080 medium, 1068 medium, 1033 medium, 1010 strong, 983 strong, 950 weak, 918 weak, 867 weak, about 840 weak, 815 medium, 790 medium, 762 medium; and its non-toxic acid addition salts.

3,997,663

ANTIBIOTIC DAUNORUBICIN AND ITS PREPARATION

Sylvie Pinnert; Leon Ninet, and Jean Preud'Homme, all of Paris, France, assignors to Rhone-Poulenc S.A., Paris, France

Continuation of Ser. No. 777,876, Nov. 21, 1968, which is a continuation-in-part of Ser. No. 280,816, May 16, 1963, Pat. No. 3,801,232. This application Dec. 11, 1972, Ser. No. 313,790

Claims priority, application France, May 18, 1962, 62.898076

Int. Cl.[2] A61K *35/74*

U.S. Cl. 424—120 **4 Claims**

1. Method of inducing a remission in a human patient having acute leukaemia or chronicmyeloid leukaemia, said method comprising administering parenterally to said patient a remission-inducing amount of daunorubicin or of a non-toxic acid addition salt thereof.

3,997,664

SUBSTITUTED CARBINOL DERIVATIVES

Eugene E. Galantay, Morristown, and Dietmar A. Habeck, Dover, both of N.J., assignors to Sandoz, Inc., E. Hanover, N.J.

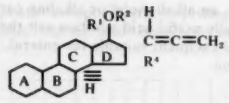
Continuation of Ser. No. 114,080, Feb. 9, 1971, abandoned, which is a continuation-in-part of Ser. No. 39,546, May 21, 1970, abandoned, which is a continuation-in-part of Ser. No. 778,777, Nov. 25, 1968, abandoned. This application Mar. 24, 1975, Ser. No. 561,487

The portion of the term of this patent subsequent to Mar. 6, 1990, has been disclaimed.

Int. Cl.[2] C07J *21/00, 17/00, 9/00;* **A61K** *31/56*

U.S. Cl. 424—238 **58 Claims**

1. A compound of the formula



Z

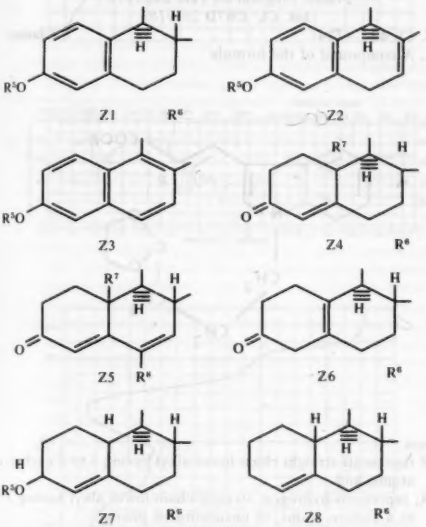
where

R^1 is alkyl having 1 to 3 carbon atoms,

R^2 is a hydrogen atom, methyl, acetoacetyl, or lower alkanoyl;

R^4 is a hydrogen atom, hydroxy, acetoacetoxy, or lower alkanoyloxy, and

Z embracing rings A and B and the substituents thereon is



Z1 R^6 Z2

Z3 Z4 R^6

Z5 R^6 Z6 R^6

Z7 R^5 Z8 R^5

where

R^5 is a hydrogen atom, alkyl having 1 to 3 carbon atoms, cycloalkyl having from 5 to 6 carbon atoms, acetoacetyl, alkanoyl having 2 to 4 carbon atoms;

R^6 is a hydrogen atom, 6α-methyl or 7α-methyl;

R^7 is a hydrogen atom, or methyl; and

R^8 is a hydrogen atom, halogen having an atomic weight of about 19 to 36 or methyl;

provided that when Z is Z1, and R^6 is hydrogen and any of R^2 and R^5 are either a hydrogen atom or lower alkanoyl, then R^4 represents a hydrogen atom.

3,997,665

VETERINARY FEEDSTUFFS

Florin Seng, Cologne-Buchheim; Kurt Ley, Odenthal-Globusch, and Karl Georg Metzger, Wuppertal-Elberfeld, all of Germany, assignors to Bayer Aktiengesellschaft, Germany

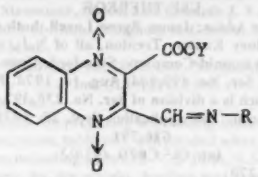
Division of Ser. No. 323,953, Jan. 15, 1973, Pat. No. 3,856,957, which is a division of Ser. No. 130,007, March 31, 1971, Pat. No. 3,819,616. This application Sept. 20, 1973, Ser. No. 399,098

Disclosure was also published under second Trial Voluntary Protest Program on Feb. 24, 1976

Int. Cl.[2] A61K *31/54*

U.S. Cl. 424—246 **34 Claims**

17. A method of promoting or enhancing growth in animals which comprises feeding an animal a growth promoting amount of a veterinary feedstuff or additive which comprises a growth promoting amount of a compound of the formula



or a pharmaceutically acceptable nontoxic salt thereof wherein

Y is hydrogen, an alkali metal cation or the cation

$R^5—\overset{+}{N}H_3$; and

each of R and R^5 is

in which each R^1 and R^2 when taken independently is identical to or different from the other, and is selected from the group consisting of hydrogen, alkyl of 1 to 4 carbon atoms and hydroxyalkyl of 1 to 4 carbon atoms, or when R^1 and R^2 are taken together with the nitrogen atom to which they are attached, a 6-membered heterocyclic ring wherein the nitrogen atom is the only heteroatom or wherein oxygen or SO_2 is also present as a ring member, in combination with a nutritious material or drinking water.

3,997,666

1-[3-(NAPHTH-1-YLOXY)-2-HYDROXYPROPYL-PIPERAZINE COMPOUNDS AND THERAPEUTIC COMPOSITIONS

Ernst-Christian Witte, Mannheim; Kurt Stach, Mannheim-Waldhof; Max Thiel, Mannheim; Gisbert Sponer, Hemsbach, and Egon Roesch, Mannheim, all of Germany, assignors to Boehringer Mannheim G.m.b.H., Mannheim, Germany

Filed Jan. 28, 1975, Ser. No. 544,719

Claims priority, application Germany, Feb. 23, 1974, 2408804

Int. Cl.[2] C07D *295/08*

U.S. Cl. 424—250 **5 Claims**

1. 1-(2-Methoxyphenyl)-4-[3-(naphth-1-yloxy)-2-hydroxypropyl]-piperazine.

3,997,667

1-[3-(NAPHTH-1-YLOXY)-PROPYL]-PIPERAZINE COMPOUNDS AND THERAPEUTIC COMPOSITIONS

Ernst-Christian Witte, Mannheim; Kurt Stach, Mannheim-Waldhof; Max Thiel, Mannheim; Gisbert Sponer, Hemsbach, and Egon Roesch, Mannheim, all of Germany, assignors to Boehringer Mannheim G.m.b.H., Mannheim, Germany

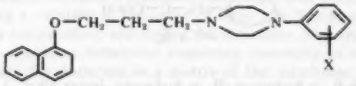
Filed Jan. 28, 1975, Ser. No. 544,721

Claims priority, application Germany, Feb. 23, 1974, 2408803

Int. Cl.[2] C07D *295/08*

U.S. Cl. 424—250 **9 Claims**

1. 1-[3-(naphth-1-yloxy)-propyl]-piperazine compound of the formula:



(I)

wherein

X is hydrogen or methoxy;

and the pharmacologically compatible salts thereof.

3,997,668

2-IMINO-1,3-DITHIETHANES AND THE PESTICIDAL USE THEREOF

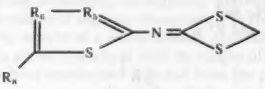
Roger Williams Addor; James Byron Lovell, both of Pennington, and Sidney Kantor, Trenton, all of N.J., assignors to American Cyanamid Company, Stamford, Conn.

Division of Ser. No. 493,944, Aug. 14, 1974, Pat. No. 3,928,382, which is a division of Ser. No. 235,397, March 16, 1972, abandoned. This application Sept. 25, 1975, Ser. No. 616,791

Int. Cl.² C07D *495/02*

U.S. Cl. 424—270 **8 Claims**

1. A 2-imino-1,3-dithietane having the formula:



wherein R_5 and R_6 each represent a member selected from the group consisting of N and CR_7 and R_7 and R_8 each represent a member selected from the group consisting of hydrogen and loweralkyl.

7. A method for controlling insects and acarina comprising: contacting the ova of said insects and acarina with an ovicidal amount ranging from about 0.4 ppm to 2500 ppm of a compound of claim **1** in an inert carrier therefor.

8. A method for controlling insects and acarina comprising applying to the larvae, larval habitat or dietary media of said larvae, a larvicidally effective amount ranging from about 1.0 ppm to 2000 ppm of a compound according to claim **1** in an inert carrier therefor.

3,997,669

TERTIARY AMINOACIDS

Richard William James Carney, New Providence, and George deStevens, Summit, both of N.J., assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

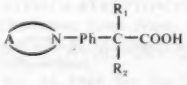
Continuation-in-part of Ser. No. 318,158, Dec. 26, 1972, Pat. No. 3,868,391, which is a continuation-in-part of Ser. No. 181,564, Sept. 17, 1971, Pat. No. 3,767,805, which is a continuation-in-part of Ser. No. 40,436, May 25, 1970, abandoned, which is a continuation-in-part of Ser. No. 8,406, Feb. 3, 1970, abandoned, which is a continuation-in-part of Ser. No. 856,154, Sept. 8, 1969, abandoned, which is a continuation-in-part of Ser. No. 843,244, July 18, 1969, Pat. No. 3,641,040, which is a continuation-in-part of Ser. No. 808,343, March 18, 1969, abandoned, which is a continuation-in-part of Ser. No. 790,863, Jan. 13, 1969, abandoned, which is a continuation-in-part of Ser. No. 757,136, Sept. 3, 1968, Pat. No. 3,657,230, which is a continuation-in-part of Ser. No. 716,347, March 27, 1968, abandoned. This application Feb. 16, 1973, Ser. No. 333,072

Int. Cl.² A61K *31/40*

U.S. Cl. 424—274 **6 Claims**

1. An anti-inflammatory pharmaceutical composition comprising

a. an anti-inflammatory effective amount of a compound of the formula



in which R_1 is hydrogen, R_2 is hydrogen, lower alkyl, 3 to 7 ring-membered cycloalkyl or cycloalkyl-lower alkyl, Ph is 1,3-or 1,4-phenylene, (lower alkyl)-1,3- or 1,4-phenylene, (halogeno)-1,3- or 1,4-phenylene or (trifluoromethyl)-1,3- or 1,4-phenylene and the group A N- is 1-oxo-isoindolino, or a lower alkyl ester, an alkali metal or alkaline earth metal salt, or a therapeutically useful acid addition salt thereof, and (b) a pharmaceutical excipient suitable for enteral, parenteral or topical application.

3,997,670

1-DIOXOLANYLPROPYL-3-INDOLEACRYLIC ACID ESTERS

Marcel K. Eberle, Madison, N.J., assignor to Sandoz, Inc., E. Hanover, N.J.

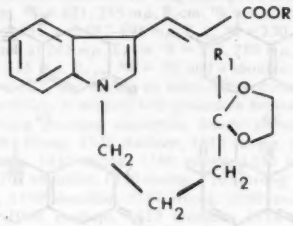
Filed Feb. 6, 1975, Ser. No. 547,547

Disclosure was also published under second Trial Voluntary Protest Program on Feb. 24, 1976

Int. Cl.² C07D *209/18*

U.S. Cl. 424—274 **6 Claims**

1. A compound of the formula



where

R represents straight chain lower alkyl having 1 to 4 carbon atoms, and

R_1 represents hydrogen, straight chain lower alkyl having 1 to 4 carbon atoms, or unsubstituted phenyl.

6. A method of treating lipidemia which comprises administering to a mammal in need of said treatment a hypolipidemic effective amount of a compound of claim **1**.

3,997,671

SILYBIN POLYMERS AND THERAPEUTIC COMPOSITIONS

Rolf Hermann Heinrich Madaus, Cologne-Bruck; Günter Halbach, Cologne, and Wilfried Trost, Bensberg-Frankenforst, all of Germany, assignors to Dr. Madaus & Co., Cologne, Germany

Filed Apr. 4, 1975, Ser. No. 565,175

Claims priority, application Germany, Apr. 4, 1974, 2416302

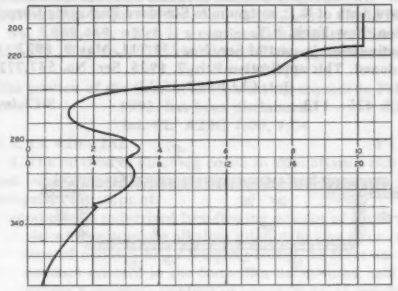
Int. Cl.² C07D *319/20*

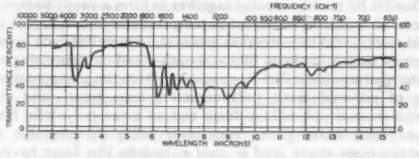
U.S. Cl. 424—278 **14 Claims**

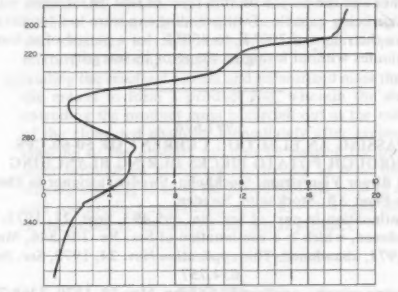
1. Polymeric Silybin having a degree of polymerization n = 2 to 8.

7. Process for preparing polymeric Silybin as claimed in claim **1** which comprises polymerizing Silybin in the presence of an aqueous mineral acid in an organic solvent system in which Silybin is sufficiently soluble, in the presence of aqueous mineral acid, that no precipitation of the monomeric starting product occurs during polymerization.

12. Therapeutic composition comprising a pharmaceutically acceptable carrier and hepotophylactically effective







amounts of polymeric Silybin having a degree of polymerization $n = 2$ to 8 as claimed in claim 1.

3,997,672

BACON PROCESSED PRODUCT

Emmett T. Stead, 100 N. Park, LaGrange, Ill. 60525, and Ray A. Kennedy, P.O. Box 1134, Sioux City, Iowa 51102

Continuation-in-part of Ser. No. 545,801, Jan. 1, 1975, abandoned, which is a continuation of Ser. No. 403,315, Oct. 3, 1973, abandoned, which is a continuation-in-part of Ser. No. 208,982, Dec. 16, 1971, abandoned. This application Aug. 27, 1975, Ser. No. 608,338

Int. Cl.² A23L *1/31*

U.S. Cl. 426—59 6 Claims

1. The method of producing a processed bacon product comprising the steps of grinding only fresh pork belly meat to form an emulsion, adding a nitrite free dry cure mixture comprised of 1%–2% pepsin, 79%–81% salt and 20%–17% sugar, during the grinding step, placing said emulsion in molds, cooking said emulsion at gradually increasing temperature from a minimum of 78° to a maximum of 152° F. for a period of six hours and thereafter chilling said cooked emulsion.

3,997,673

METHOD FOR PREPARING BREADING

Palmer K. Strommer, Osseo, and Kenneth J. Valentas, Golden Valley, both of Minn., assignors to General Mills, Inc., Minneapolis, Minn.

Filed Oct. 16, 1975, Ser. No. 623,129

Int. Cl.² A21D *2/00*

U.S. Cl. 426—62 5 Claims

1. A method for preparing a breading material comprising mixing flour, yeast, table salt, dehydrated whey, and flavoring, said mixture including about 85–97% flour, 0.5–2% yeast, and 0.5–5% whey, by dry weight, feeding said mixture to a confined elongated treating zone, said zone having a gaseous fluid pressure of at least 15 p.s.i.g. and a temperature of at least 250° F. and simultaneously subjecting said mixture to a gaseous flow of sufficient magnitude to propel the material through said pressurized treating zone thereby producing a material in suitable form for use as a breading.

3,997,674

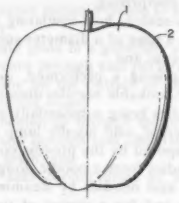
PRESERVATION OF AGRICULTURAL PRODUCTS

Nobuo Ukai, Yanagawa; Shingo Ishibashi; Toshio Tsutsumi, both of Kurume, and Kyoichi Marakami, Fukuoka, all of Japan, assignors to Tsukihoshi Kasei Kabushiki Kaisha, Japan

Filed Feb. 25, 1975, Ser. No. 552,738

Int. Cl.² A23B *7/16*, *9/00*, *5/06*

U.S. Cl. 426—90 22 Claims



10. A process for preserving agricultural products which carry on living functions after harvesting selected from the group consisting of fruits, vegetables and grain or for the preservation processing of the unshelled eggs of fowl which comprises applying an aqueous dispersion of a coating layer to cover the outer surfaces of said agricultural products or the said eggs of fowl, said aqueous dispersion being prepared by dispersing a hydrophobic substance selected from the group consisting of natural waxes, vegetable fatty oils, hydrogenated fatty oils, and mineral oils in the form of microparticles in an aqueous solution of a water-soluble high polymer and an emulsifier constituting a dispersion medium, said water-soluble high polymer selected from the group consisting of polysaccharides, polysaccharide derivatives, proteins, alginates, and polyvinyl alcohols and said emulsifier selected from the group consisting of a sucrose fatty acid ester, lecithin and an alkali metal salt of oleic acid; the ratio of the volume of hydrophobic substance to the volume of the high polymer being in the range of 10:1 to 10:5 and the content of the hydrophobic substance in the dispersion being in the range of 3–20%, said microparticles of hydrophobic substance being of a particle size range of from 0.1 micron to 10 microns, and wherein said emulsifier is used in amounts necessary to maintain the microparticles of hydrophobic substance dispersed within the dispersion medium within said size range, said composition having a viscosity in the order of from 3 to 50 cps at about room temperature, and drying the dispersion thus applied to form a coating membrane consisting essentially of said microparticles dispersed in a matrix of the membrane of said water-soluble high polymer and wherein the coating membrane is characterized by having fine continuous microvoids formed between said microparticles and said matrix, thereby to controllably suppress the respiration of the agricultural products or preserve the eggs.

3,997,675

CAT FOOD COATED WITH ASCOMYCETUS OR ASPOROGENOUS YEASTS

Robert James Eichelburg, Woodland Road, Pound Ridge, N.Y. 10576

Filed Mar. 5, 1974, Ser. No. 448,208
Int. Cl.[2] A23B *4/00*; A23L *1/216*; A23K *1/18*
U.S. Cl. 426—92 7 Claims

1. A process for improving the palatability of dry cat food kibs comprising coating said kibs with from about 0.5% to about 20% by weight of a dry yeast selected from a member of the group consisting of ascomycetus yeasts and asporogenous yeasts said dry cat food kib comprising from about 30% to about 65% by weight of farinaceous material and from about 25% to about 40% by weight of proteinaceous material and feeding said coated cat food kibs to a cat.

3,997,676

INSTANT-COOKING CUPPED NOODLES AND A METHOD OF PRODUCING THE SAME

Momofuku Ando, Osaka, Japan, assignor to Nissin Shokuhin Kaisha, Ltd., Osaka, Japan

Continuation-in-part of Ser. No. 291,601, Sept. 25, 1972, abandoned. This application Mar. 19, 1976, Ser. No. 668,494
Int. Cl.[2] A23L *1/16*
U.S. Cl. 426—113 8 Claims

1. A noodle cup comprising:

a. a hermetically-sealed, heat-insulating cup having sides which taper to a base of a diameter smaller than the top portion of the cup; and

b. contents comprising a preformed, dehydrated noodle lump of instant-cookable noodles disposed in the cup, the individual noodles being substantially evenly dehydrated to the core thereof, said noodle lump having been preformed and disposed by the process comprising:

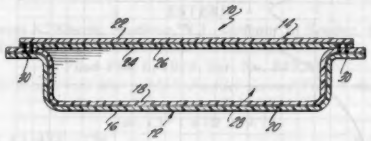
1. forming noodles from a noodle dough;
2. gelatinizing said noodles by steaming or boiling at a temperature and for a period of time such that the noodles contain 25–40% moisture;
3. providing a cup-shaped mold corresponding substantially in size and shape to the inner shape of a cup into which said noodles are to be disposed and having a top and bottom and permeable upper and lower portions for permitting frying oil to pass therethrough;
4. placing a sufficient quantity of said gelatinized noodles into said mold to occupy 50–80% thereof by volume;
5. dehydrating said noodles by dipping said mold containing said noodles into heated frying oil for a period of time sufficient to cause the noodles to move upward into contact with said permeable upper portion during evaporation and dissemination of moisture therefrom, thereby producing a lump having a dense upper portion, a dense lower portion and a shape corresponding to the inner shape of said mold;
6. removing said mold from said oil;
7. removing said noodle lump from said mold;
8. drying said noodle lump before placement of the noodle lump into said cup;
9. placing the dried noodle lump into said heat-insulating cup with the denser portion of the lump being upwardly disposed, the sides of the lump being in frictional engagement with the sides of the cup and the lump being seated at spaced distances from the top and bottom of the cup, and;
10. hermetically sealing said cup whereby the contents of the cup are capable of being stored and subsequently cooked and restored in an extremely short period of time by the addition of hot water to the cup, the hot water being first received in the spaced distance in the bottom of the cup to heat the contents during which time, the denser portion of the noodle lump tends to retard heat loss during cooking.

3,997,677

HIGH TEMPERATURE RESISTANT HERMETICALLY SEALED PLASTIC TRAY PACKAGES

Arthur Hirsch, Elizabeth, and Francis X. Spiegel, Cedar Grove, both of N.J., assignors to Standard Packaging Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 251,711, May 9, 1972, abandoned. This application Feb. 7, 1975, Ser. No. 547,772
Int. Cl.[2] B65B *25/22*
U.S. Cl. 426—113 5 Claims



1. A hermetically sealed plastic package for use at temperatures above 300° F. comprising a semi-rigid tray member and a flexible lid member sealed together to form a cavity between them, an article to be heated to temperatures above 300° F. in said cavity, said tray member and said lid member each being formed from a laminate film and each member comprising an outer thermoplastic film layer selected from the group consisting of polycarbonate, polypentamethylene homo- and copolymers and polysulfone films and an inner polyolefin film layer, said thermoplastic film layer being thermostable at temperatures above 300° F., said polyolefin film layer having a softening point greater than 180° F. but less than 300° F., a hermetic seal between the polyolefin film layer of said tray member and the polyolefin film layer of said lid member, said package being capable of withstanding exposure to a temperature in the range of 300° F. to 450° F. for a period of at least 15 minutes without losing its shape or its integrity.

3,997,678

PASSING AN ELECTRIC CURRENT OF 50-60 CPS THROUGH POTATO PIECES DURING BLANCHING

Knut Birger Vigerstrom, Stockholm, Sweden, assignor to Electro-Food AB, Stockholm, Sweden

Continuation-in-part of Ser. No. 399,493, Sept. 21, 1973, abandoned, which is a continuation of Ser. No. 146,846, May 25, 1971, abandoned. This application Nov. 24, 1975, Ser. No. 634,757
Claims priority, application Sweden, May 28, 1970, 7368/70
Int. Cl.[2] A21D *6/00*
U.S. Cl. 426—244 4 Claims

1. In a method of preparing deep-fried potato products comprising the steps of (a) blanching the uncooked potato pieces, including washing and preheating the potato pieces prior to cooking, and (b) deep frying the thus-treated potatoes, the improvement comprising passing an electric current of about 50 – 60 cycles per second directly through the potato pieces during the blanching step (a).

3,997,679

STABILIZATION OF XANTHOPHYLLS

Ralph Salkin, Kinnelon, N.J., assignor to CPC International Inc., Englewood Cliffs, N.J.

Filed Aug. 12, 1974, Ser. No. 496,489
Int. Cl.[2] A23L *1/275*; A23K *1/16*
U.S. Cl. 426—250 10 Claims

1. A stabilized xanthophyll product derived from marigolds in which the xanthophyll esters are partially saponified and which contains unsaponified xanthophyll esters in an amount of from about 10% up to no more than about 50% by weight of the original xanthophyll esters, said product having a pH of at least about 8.

3,997,680

METHOD OF DUTCHING COCOA

Manuel Larry Chalin, Mahopac, N.Y., assignor to Imperial Chemical Industries Limited, London, England

Continuation-in-part of Ser. No. 443,517, Feb. 19, 1974, Pat. No. 3,868,469, which is a continuation-in-part of Ser. No. 253,839, May 16, 1972, abandoned. This application Feb. 24, 1975, Ser. No. 552,378

The portion of the term of this patent subsequent to Feb. 25, 1992, has been disclaimed.

Int. Cl.² A23G *1/00, 1/04*

U.S. Cl. 426—262 8 Claims

1. The method of dutching cocoa so as to attain a rich color and other favorable parameters in the end product, which comprises the steps of:

combining a pulverized free-flowing powder of cocoa material with an aqueous alkaline solution having a concentration of about 3 to 12 weight percent, to form an initial product mixture in the form of a damp mass, said mass having a moisture content of about 20 to 35 weight percent and a maximum of up to about 6 weight percent alkaline equivalent to potassium carbonate to form a homogeneous product mixture;

cooking the product mixture at a temperature of about 150–230° F. for a residence period of about two and one-half to five minutes while continuing mixing and while progressively increasing the pressure to a final stage of pressurization of about 500-1300 pounds per square inch to form a heated and pressurized mass, wherein cooking is performed by feeding the product mixture into a chamber containing means to form the product mixture into a working mass corresponding to said chamber, providing progressively greater pressure on said working mass as the mixture moves from the entrance end of the chamber to the exit end, and controlling the heating in said chamber to raise the temperature of the product mixture to cooking temperature;

extruding the resultant heated and pressurized mass through die means to form a product rod, wherein the step of extruding the product mass is carried out at the exit end of the elongated chamber immediately after pressurized cooking of the product mixture by passing the product mass through an extruding die having at least one restricted opening to form the product in the form of a rod, said rod product containing about 85–97 weight percent of the moisture content of the initial product.

3,997,681

METHOD OF COOKING GRAIN

Elbert J. Guyer, c/o Moridge Manufacturing Co., Moundridge, Kans. 67202

Continuation of Ser. No. 416,858, Nov. 19, 1973, abandoned, which is a division of Ser. No. 200,822, Nov. 22, 1971, Pat. No. 3,815,491. This application Apr. 7, 1975, Ser. No. 565,420

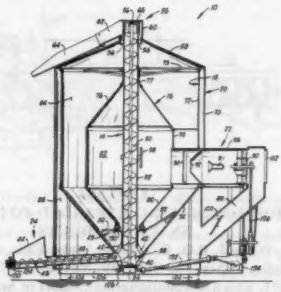
The portion of the term of this patent subsequent to June 11, 1991, has been disclaimed.

Int. Cl.² A23L *1/01;* A23N *15/00*

U.S. Cl. 426—465 4 Claims

1. A method of cooking grain comprising:

a. introducing said grain into a cooker having a perforate inner vessel forming an inner cavity, a perforate second vessel around said inner vessel forming a second cavity between said inner vessel and said second vessel, an outer impervious vessel enclosing said second vessel forming an outer cavity between said second vessel and said outer vessel, an upright auger means within said inner cavity, means to move grain to said auger means, means to remove grain from said upright auger means, heating means which, in operation receive air, heat same and force same into said inner cavity, said inner vessel has conical upper and lower portions with said upright auger means passing through the apex portions thereof, said outer vessel has a conical lower portion in alignment with said inner vessel with said auger means passing through the apex portion thereof, said outer vessel has a conical lower portion in alignment with said inner vessel with said auger means passing through the apex portion thereof, said means to move grain to said auger means is a second auger means in communication with the lower portion of said upright auger means to pass grain from a source outside said cooker to said upright auger means, said means to remove grain rom said upright auger means is a directionally controllable conduit means on the upper end portion of



said upright auger means a means to stir said grain in said second cavity;

b. circulating said grain in a generally vertical fashion with said auger means through said perforate inner vessel and dispersing same on the outside of said inner vessel but inside said second vessel

c. passing said heated air through the perforate area of said inner vessel and through said dispersed grain of step (b) to cook said grain; and

d. discharging said cooled grain of step (c) from said cooker.

3,997,682

OLEAGINOUS FOOD FLAVORED WITH CERTAIN ALPHA CARBOXY ACIDS AND/OR ESTERS THEREOF

Robert R. Allen, Plano, Tex., assignor to Anderson, Clayton & Co., Houston, Tex.

Continuation-in-part of Ser. No. 174,932, Aug. 25, 1971, abandoned. This application Dec. 4, 1972, Ser. No. 311,803

Int. Cl.² A23L *1/226*

U.S. Cl. 426—534 9 Claims

1. Composition of matter comprising a blend of:

a. a neutral oleaginous food and

b. between about 1 and 100 parts per million of at least one of the alpha carboxy acids selected from the group consisting of alpha carboxy butyric, isobutyric, valeric, isovaleric, caproic, capric and caprylic acids.

3,997,683

METHOD TO IMPROVE THE PHYSICAL ORGANOLEPTICAL AND FUNCTIONAL PROPERTIES OF FLOUR-BASED PRODUCTS THROUGH THE USE OF YEAST AND PRODUCT OF SAID METHOD

Philip George Schnell, Wheaton, Ill., assignor to Standard Oil Company (Indiana), Chicago, Ill.

Filed June 20, 1976, Ser. No. 588,678

Int. Cl.² A21D *10/04*

U.S. Cl. 426—552 11 Claims

1. A process for improving the physical, organoleptical and functional properties of batter, breading and meat-filler, flour-based products comprising incorporating a single cell protein (SCP) containing material in an amount of 3 to 10 percent based on the weight of said flour-based products, wherein the said material is intended for use in food products, derived

from unicellular microorganisms grown in a fermentor aerobically in a suitable fermentation broth, and selected from the group consisting of (1) dried yeast, and (2) dried yeast saturated with vegetable oil which increases adhesion of the batter to the fried product, and adds structure and resiliance to breadings and fillers.

3,997,684

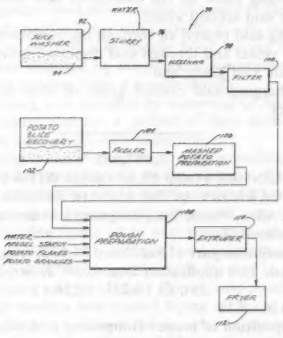
METHOD FOR MAKING EXPANDED POTATO BASED SNACK PRODUCTS

Miles J. Willard, P.O. Box 2774, Idaho Falls, Idaho 83401

Division of Ser. No. 309,509, Nov. 24, 1972, Pat. No. 3,886,291, which is a continuation-in-part of Ser. No. 174,232, Aug. 23, 1971, abandoned, which is a continuation of Ser. No. 789,922, Jan. 8, 1969, abandoned. This application Nov. 27, 1974, Ser. No. 527,604

Int. Cl.² A23L *1/10*

U.S. Cl. 426—550 20 Claims



1. A method for making a potato based food snack product from a dough comprising the steps of mixing the dough and extruding a piece from the dough in preparation for frying the dough piece in hot cooking oil so that at the time the dough is immersed in the hot cooking oil it consists of a mixture of

a. solids consisting essentially of cooked potato solids and ungelatinized starch, and

b. water,

c. in which the solids are more than 40 percent and up to about 50 percent by weight of the dough, and

d. in which the solids contain between about 30 to about 70 percent ungelatinized starch by weight, with the balance being cooked potato solids containing sufficient available free gelatinized starch to cause the dough piece to expand between 1.6 to 3.0 times when fried,

cooking the dough piece in the hot cooking oil at a sufficiently high temperature and for a long enough period of time to cause the dough piece to expand to a thickness of between about 1.6 to about 3.0 times that of the original smallest dimension of the piece during extrusion to form a finished fried potato snack, and

thereafter removing the fried potato snack from the oil.

3,997,685

STABLE AROMA, FLAVOR AND AROMA AND FLAVOR PRODUCTS FROM AROMA- AND FLAVOR-BEARING SUBSTRATES

Rudolf Gottfried Karl Strobel, Cincinnati, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio

Continuation-in-part of Ser. No. 158,590, June 30, 1971, Pat. No. 3,717,472. This application Feb. 6, 1973, Ser. No. 330,143

Claims priority, application Italy, June 28, 1972, 51207/72

The portion of the term of this patent subsequent to Feb. 20, 1990, has been disclaimed.

Int. Cl.² A23F *1/08;* A23N *1/00*

U.S. Cl. 426—594 24 Claims

24. A process for producing a stable concentrated flavorful aromatic dry product from a flavor-and aroma-bearing substrate comprising: slowly and continuously passing wet steam into a zone containing an aroma— and flavor-bearing substrate in a manner which avoids flooding said zone and while said zone is held at an absolute pressure of from about 0.1 mm to 200 mm of mercury, thereby to provide a continually moving interface between dry and wetted particles of said substrate; prior to the reaching of said moving interface to the end of said zone and the emergence of a liquid flavor concentrate fraction from said zone, collecting an aroma— and flavor-containing frost fraction by condensing aroma and flavor bodies removed from said substrate at a temperature of from about −20° to −200° C; combining said aroma— and flavor-containing frost fraction with a solution of solids selected from the group consisting of proteins and carbohydrates; freezing the resulting mixture; and freeze drying.

3,997,686

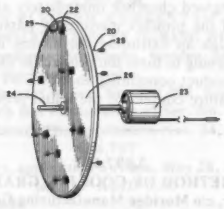
ORNAMENT AND METHOD OF MANUFACTURE

Stewart McClure, 4501 E. Charles Ronald Ave., Las Vegas, Nev. 89121

Filed Oct. 16, 1974, Ser. No. 515,321

Int. Cl.² A01N *3/00*

U.S. Cl. 427—4 3 Claims



1. A method of producing an ornament comprising:

a. drying an animal dropping;

b. contacting the dropping with an abrasive material to remove the natural outer coating therearound to expose the interior grain surface;

c. immersing the dropping in a liquid resin to form a resin coating thereon; and

d. curing said resin while rotating said resin coated dropping along a vertical plane with the elongated axis of said dropping extending normal to said plane to form a hard, transparent coating.

3,997,687

METHOD OF PREPARING OPTICAL WAVEGUIDES

William Phillips, Princeton, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Apr. 21, 1975, Ser. No. 569,858

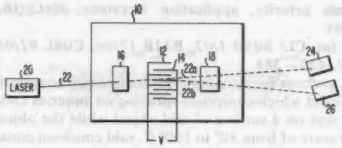
Int. Cl.² G02B *5/14;* B05D *5/06;* C23C *13/02;* B05D *3/02*

U.S. Cl. 427—12 7 Claims

1. The method of making an optical waveguide which comprises:

a. annealing a single crystal of lithium tantalate in a salt of lithium to diffuse lithium atoms into said crystal wherein the annealing temperature is below the melting point of the lithium salt,

b. depositing a film of niobium on a polished surface of the said crystal,



c. oxidizing the niobium,

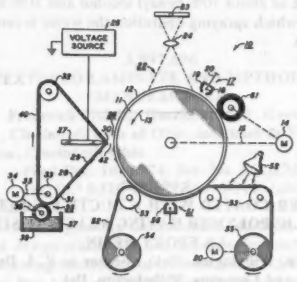
d. annealing said crystal at an elevated temperature to allow the niobium to diffuse into said crystal, and

e. cooling said crystal to room temperature.

3,997,688
DEVELOPING AN ELECTRICAL IMAGE

Robert W. Gundlach, Victor, N.Y., and David H. Perry, deceased, late of Webster, N.Y. (by Joyce Perry Province, administratrix), assignors to Xerox Corporation, Stamford, Conn.

Division of Ser. No. 474,998, May 31, 1974. This application Feb. 10, 1975, Ser. No. 548,485
Int. Cl.² G03G *13/08*
U.S. Cl. 427—25 **14 Claims**



1. A method for developing an electrostatic latent image provided on a charged surface of a photoconductive member, comprising the steps of:

providing adjacent the image bearing surface a substantially non-conductive donor sheet bearing on the side facing the image a layer of releasably adhering electrostatically charged marking material, the layer of marking material being spaced from the image bearing surface;

placing an edge of a conductor against the other side of the donor sheet;

coupling the conductor to ground;

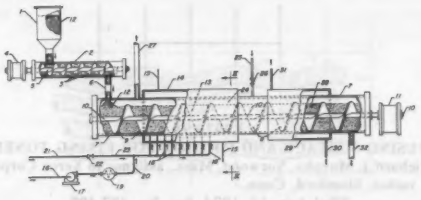
moving the edge and the donor sheet with respect to each other, slidable contact being maintained between the edge and donor sheet; and

simultaneously moving the edge and the photoconductive member with respect to each other so that different parts of the image bearing surface are brought within a predetermined distance from the edge, the image bearing surface of the photoconductive member being kept out of contact with the layer of marking material on the donor, whereby the electrical field developed between the image bearing surface and the conductor drives marking material from the layer to the photoconductive member and the driven material develops the latent image.

3,997,689
PREPARATION OF SEMICONDUCTING PYROPOLYMERIC INORGANIC REFRACTORY OXIDE MATERIALS

George L. Hervert, Woodstock, Ill., assignor to UOP Inc., Des Plaines, Ill.

Filed July 17, 1975, Ser. No. 596,707
Int. Cl.² B05D *5/12*
U.S. Cl. 427—82 **4 Claims**

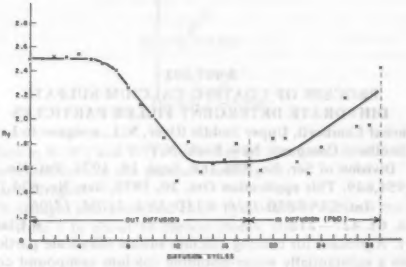


1. A process for the preparation of a semiconducting carbonaceous pyropolymeric inorganic refractory oxide material which comprises continuously moving an inorganic refractory oxide material by means of a rotating screw member laterally through a reaction zone maintained at a temperature of at least about 700° C., simultaneously introducing a gaseous hydrocarbon pyropolymeric precursor into said zone in sufficient amount and sufficient pressure to effect a semifluidized contact of said inorganic refractory oxide material with said gaseous hydrocarbon during the lateral movement of the inorganic material through said zone, withdrawing and cooling the resultant semiconducting carbonaceous pyropolymeric inorganic refractory oxide material at a temperature of from about 150° C. to about 200° C., and thereafter recovering the semiconducting material.

3,997,690
METHOD OF ADJUSTING REFRACTIVE INDEX OF PLZT OPTICAL COATING ON OPTICAL ELEMENT

Di Chen, Minnetonka, Minn., assignor to Honeywell Inc., Minneapolis, Minn.

Filed May 27, 1975, Ser. No. 581,302
Int. Cl.² B05D *5/06*; C04B *35/46*; C23C *15/00*
U.S. Cl. 427—162 **10 Claims**



1. A method of adjusting the index of refraction of a lanthanum modified lead-zirconate-titanate (PLZT) optical coating which has been deposited on an optical body comprising the steps of:

a. providing a controlled atmosphere for the coated optical body;

b. heat treating the coated optical body in the controlled atmosphere to thereby adjust the index of refraction of the optical coating for modified reflectance or transmittance.

6. A method of preparing an optical coating of a desired refractive index on an optical body comprising the steps of:

a. depositing an optical coating of lanthanum modified lead-zirconate-titanate on an optical body, the coating having an initial index of refraction which may differ from a desired index; and

b. heat treating the deposited coating in a controlled atmosphere to adjust the index of refraction thereof to the desired index.

3,997,691

FUSING SURFACE AND METHOD FOR FIXING TONER

Richard J. Murphy, Norwood, Mass., assignor to Xerox Corporation, Stamford, Conn.

Filed Aug. 14, 1974, Ser. No. 497,409

Int. Cl.² B05D *3/02, 3/12;* G03G *13/20*

U.S. Cl. 427—195 9 Claims

1. A method of fixing a resin-based powder image to a substrate comprising:

a. contacting a substrate bearing a resin-based powder image with a structure comprising a heated surface of a silicone rubber layer for a time and at a temperature sufficient to permit the fusion of the resin-based powder to the substrate, the silicone rubber capable of forming a degradation product in the presence of water at elevated temperature and having dispersed therein an agent capable of supplying sufficient moisture to cause the degradation of the silicone rubber and the formation of the degradation product on the heated surface, said degradation product having an adhesion for the fused resin-based powder which is less than the adhesion which the fused resin-based powder has for the substrate;

b. separating the substrate from the heated surface whereby the fused resin-based powder is retained on the substrate; and

c. permitting the fused resin-based powder on the substrate to cool.

3,997,692

PROCESS OF COATING CALCIUM SULFATE DIHYDRATE DETERGENT FILLER PARTICLES

Vincent Lamberti, Upper Saddle River, N.J., assignor to Lever Brothers Company, New York, N.Y.

Division of Ser. No. 506,160, Sept. 16, 1974, Pat. No. 3,954,649. This application Oct. 20, 1975, Ser. No. 624,157

Int. Cl.² B05D *1/16;* C11D *3/14, 11/04, 17/06*

U.S. Cl. 427—215 6 Claims

1. A process for coating calcium sulfate dihydrate particles with a substantially water-insoluble calcium compound comprising (i) dispersing 10% to 75% by weight, based on the total combined weight of the insoluble calcium compound and calcium sulfate dihydrate, of particles of calcium sulfate dihydrate in an aqueous solution of a compound capable of supplying anions which form substantially water-insoluble salts, said compound being selected from the group consisting of water-soluble carbonates, silicates, sulfites, and orthophosphates, (ii) agitating said aqueous solution until said substantially insoluble calcium salt forms as a coating on and interspersed with said particles of calcium sulfate dihydrate, and (iii) separating said coated particles from said solution.

3,997,693

PROCESS FOR APPLYING A HARD WAX PROTECTIVE COATING ON GLASS

Burkhard Kircher, Mettmann/Rhl., Germany, assignor to Centralin Gesellschaft, Chem. Fabrik Kircher & Co., Mettmann, Germany

Filed Oct. 16, 1974, Ser. No. 515,152

Claims priority, application Germany, Oct. 16, 1973, 2351801

Int. Cl.² B05D *1/02;* B32B *17/06;* C08L *91/06*

U.S. Cl. 427—384 1 Claim

1. A process for forming a protective surface coating on a glass object which comprises spraying an aqueous emulsion of a hard wax on a surface of said object while the object is at a temperature of from 80° to 100° C, said emulsion consisting of water and a mixture of water-free ingredients in the following proportions expressed as % by weight:

1,3-Butanediol montanoate	40
Purified Carnauba wax	25
Hard paraffin wax, with melting point of from 50° to 64° C and a penetration of from 10 to 24	20
Alkyl Ethoxylate emulsifier	15

the said mixture being proportioned with respect to the amount of water so that the hard wax and water are present in the emulsion in a ratio of about 1:100 parts by weight, and said emulsion further containing a preservative additive consisting of a mixture of about 70% benzyl alcohol and 30% formaldehyde; after which spraying operation the water is removed by evaporation.

3,997,694

CONTAINER COATED WITH A DUCTILE COATING OF AN ACRYLIC POLYMER HAVING REACTIVE SITES AND AN EPOXY RESIN

Souheng Wu, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 428,723, Dec. 12, 1973, Pat. No. 3,943,187. This application July 3, 1975, Ser. No. 593,020

Int. Cl.² B65D *1/12;* B44D *1/50*

U.S. Cl. 428—35 4 Claims

1. A container coated on at least one side with a dried coalesced coating about 0.2–2 mils in thickness, in which the coating consists essentially of a fully cured composition of

a. 60–95% by weight of an acrylic polymer of polymerized units of 10–25% by weight of styrene, 65–87.5% by weight of an alkyl acrylate having 2–4 carbon atoms in the alkyl group, 2–7% by weight of butoxymethyl acrylamide, 0.5–3% by weight of acrylic acid or methacrylic acid having a number average molecular weight of above 10,000 determined according to gel permeation chromatography and a glass transition temperature of −20° to +60° C, and

b. 5–40% by weight of an epoxy resin having at least one terminal vic epoxide group in combination with at least one hydroxyl group or epoxide group or mixture thereof per polymer chain and having a number average molecular weight of 300 to 20,000 determined as above;

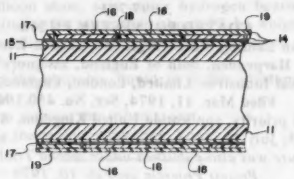
wherein the film-forming constituents in the fully cured state have a brittle ductile transition temperature of −40° C to +20° C measured at an elongation rate of 10% per minute on an Instron testing machine using a free film about 2–4 mils thick.

3,997,695

PROTECTIVE COVERING FOR FIBERGLASS BOOM

Edward Gitt, Media; Donald E. Ryder, Fort Washington, and Edward L. Dold, Woodlyn, all of Pa., assignors to Gitco, Inc., Clifton Heights, Pa.

Filed June 12, 1975, Ser. No. 586,321
Int. Cl.² B31C *13/00*; B65H *81/00*; C09J *3/00*
U.S. Cl. 428—36 4 Claims



1. In an aerial lift including a boom comprised of a fiberglass reinforced polymeric resin, a surface covering for said boom, comprising:

polyurethane coating applied to the surface of said boom; and

polyurethane strip material spirally wrapped over said polyurethane coating and bound to said polyurethane coating by use of a solvent sealer selected from the group consisting of tetrahydrofuran, methyl-ethyl-ketone and di-methyl-formamide.

3,997,696

TEXTURED LAMINATE AND METHOD OF MANUFACTURE

Richard Frederick Jaisle, Harrison, and George Edward Power, Cincinnati, both of Ohio, assignors to Formica Corporation, Cincinnati, Ohio

Filed Dec. 10, 1974, Ser. No. 531,275
Int. Cl.² B32B *3/28*, *5/04*; B31F *1/00*
U.S. Cl. 428—164 10 Claims

1. A heat and pressure consolidated, durable, heat-stable, embossed design master for use in producing embossed laminates consisting essentially of at least about 45%, by weight, on a resin-free basis, of at least five thermoset resin impregnated asbestos paper sheets of which at least about 85%, by weight, is bound asbestos fibers of No. 3 to No. 7 size, and, on at least one major surface thereof, not more than about 55%, by weight, on a resin-free basis, of at least one sheet of thermoset resin impregnated cellulosic extensible kraft paper which acts as a telegraphing preventative, the master being embossed on said sheeted major surface, said sheeted major surface forming an exterior surface of said master adapted to contact the surface of a laminate during the formation thereof to impart an embossment thereto.

5. A process for producing a heat and pressure consolidated, durable, heat-stable, embossed design master for use in producing embossed laminates which comprises

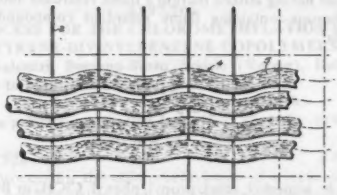
A. releasably impressing a sculptured design plate under heat and pressure into the kraft paper sheeted surface of an assemblage of at least about 45%, by weight, on a resin-free basis, of at least five thermosetting resin impregnated asbestos paper sheets of which at least about 85%, by weight, is bound asbestos fibers of No. 3 to No. 7 size, and not more than about 55%, by weight, on a resin-free basis, of at least one sheet of thermosetting resin impregnated cellulosic extensible kraft paper which acts as a telegraphing preventative to form an embossment on said sheeted surface of said master and recovering the resultant embossed master.

3,997,697

FABRIC WITH BORON FILAMENTS

Jean Brochier, Villeurbanne, France, assignor to J. Brochier & Fils, Villeurbanne and Avions Marcel Dassault-Breguet Aviation, Societe Anonyme Francaise ayant son siege Social, Paris, both of, France

Continuation of Ser. No. 358,879, May 10, 1973, abandoned. This application Mar. 27, 1975, Ser. No. 562,855
Int. Cl.² D03D *15/00*
U.S. Cl. 428—259 7 Claims



1. A unidirectionally tensionable and reinforced fabric having a woven body formed by a low-density open warp consisting of natural or synthetic threads and having a density of 2 to 20 threads per cm, the threads of said warp being substantially parallel; and a high density planar weft of spaced-apart single boron threads interwoven with and substantially orthogonal to the warp, said boron threads being held together exclusively in a single layer in side-by-side relation, said weft having a density of at least 90 threads per cm.

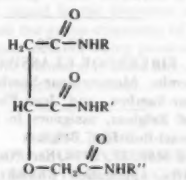
3,997,698

PROCESS OF SIZING FABRICS AND THREADS WITH TRIAMIDES

Vincent Lamberti, Upper Saddle River, N.J., assignor to Lever Brothers Company, New York, N.Y.

Division of Ser. No. 469,492, May 13, 1974, Pat. No. 3,959,373. This application Nov. 3, 1975, Ser. No. 628,007
Int. Cl.² B05D *5/08*; C08L *3/00*; D06M *13/18*, *13/40*
U.S. Cl. 428—262 2 Claims

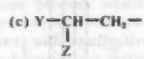
1. A process for sizing textile fabrics comprising applying to said fabric an amide having the molecular structure



wherein R, R′, and R″, which may be the same or different, are selected from the group consisting of:

a. hydrogen,

b. straight and branched chain hydrocarbon radicals having from 1 to about 18 carbon atoms, and



wherein Z is selected from the group consisting of H and OH and when Z is H, Y is OH or CH_2OH, and when Z is OH, Y is CH_3, and

d. combinations of (a), (b) and (c).

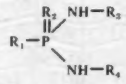
2. A process for simultaneously sizing and lubricating cotton thread comprising applying to said thread an emulsion of starch and an amide having the structure set forth in claim 1.

3,997,699
FLAME RESISTANT SUBSTRATES

Thomas O. Sistrunk, Southfield, Mich., assignor to Ethyl Corporation, Richmond, Va.

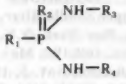
Filed Apr. 25, 1975, Ser. No. 571,738
Int. Cl.² D06M *13/44;* **B32B** *27/36*
U.S. Cl. 428—276 **35 Claims**

1. A flame resistant substrate comprising cotton and polyester fibers, said polyester fibers having incorporated therein tetrabromobis-phenal-A ethoxylate flame retardant, and said substrate having affixed thereto a flame retardant amount of a phosphorous-containing flame retardant compound of the formula



where R_1 is methyl, ethyl, propyl, phenyl, $ClCH_2$ or $BrCH_2$; R_2 is oxygen or sulphur; R_3 is hydrogen, methyl, ethyl or propyl; and R_4 is hydrogen, methyl, ethyl or propyl.

28. A method for increasing the flame resistance of a substrate of cotton and polyester fibers, said polyester fibers having incorporated therein a tetrabromobis-phenol-A ethoxylate flame retardant, said substrate comprising from about 35% to about 75% polyester by weight, the remainder being cotton, comprising treating said substrate with a solution of a phosphorus-containing flame retardant, said solution comprising from about 5% by weight to about 30% by weight of said phosphorus-containing flame retardant, the remainder being water, said phosphorus-containing flame retardant comprising a compound of the formula

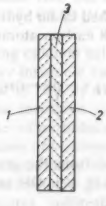


where R_1 is methyl, ethyl, propyl, phenyl, $ClCH_2$ or $BrCH_2$; R_2 is oxygen or sulphur; R_3 is hydrogen, methyl, ethyl or propyl, and heating said compound to a sufficient temperature for a time sufficient to cure said flame retardant.

3,997,700
FIREPROOF GLASSWORK

Francis Jacquemin, Monceau-sur-Sambre; Robert Terneu, Montignies-sur-Sambre, and Jean-Pierre Voiturier, Gerpinnes, all of Belgium, assignors to Glaverbel-Mecaniver S.A., Watermael-Boitsfort, Belgium

Filed Mar. 28, 1974, Ser. No. 455,718
Claims priority, application United Kingdom, Sept. 17, 1973, 43537/73
Int. Cl.² B32B *17/06*
U.S. Cl. 428—332 **17 Claims**



1. A fire screening glazing panel comprising
a first structural ply formed by a vitreous sheet,
a second structural ply formed by a vitreous or plastic sheet, and
a layer formed between said plies comprising a material which is convertible to form a thermally insulating barrier of porous or cellular structure when said panel is subjected to sufficient heat, such as when said panel is subjected to a fire, said material being an hydrated metal salt selected from the group consisting of aluminates, plumbates, stannates, alums, borates, and phosphates.

3,997,701
COATED POLYESTER FILMS

Cyril John Ealding, Puckeridge, and Gordon Edmund Alfred Pears, Harpenden, both of England, assignors to Imperial Chemical Industries Limited, London, England

Filed Mar. 11, 1974, Ser. No. 450,196
Claims priority, application United Kingdom, Apr. 2, 1973, 15704/73; July 16, 1973, 33715/73
Disclosure was also published under second Trial Voluntary Protest Program on Feb. 10, 1976
Int. Cl.² B32B *27/06, 27/36*
U.S. Cl. 428—341 **4 Claims**

1. An antistatic polyester film coated on one side with an antistatic layer comprising lithium nitrate and an acrylic or methacrylic polymer or copolymer binder wherein the coat weight of lithium nitrate is at least 100 $\mu g/dm^2$.

3,997,702
STRATUM HAVING RELEASE PROPERTIES AND METHOD OF MAKING

Frank A. Schurb, and Jack L. Evans, both of St. Paul, Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Division of Ser. No. 423,706, Dec. 11, 1976, Pat. No. 3,957,724. This application Aug. 13, 1975, Ser. No. 604,327
Int. Cl.² C09J *7/02;* **B05D** *3/02*
U.S. Cl. 428—352 **9 Claims**

1. A pressure-sensitive adhesive tape in which a sheet backing is provided, on one surface, with a layer of normally tacky and pressure-sensitive adhesive and on the other surface with a low adhesion backsize which is
the solid, crosslinked, substantially insoluble joined interpenetrating polymeric network reaction product of starting materials consisting essentially of (1) 98–50 parts by weight of a first moiety terminated with from more than 1 to not more than 3 isocyanate groups, liquid at 60° C., having an NCO equivalent weight of at least about 100, containing not more than 5 urethane or urea gram equivalents per 1000 grams of said moiety, and formed by reacting one or more polyisocyanates with one or more diols, triols, diamines or triamines, and (2) correspondingly 2–50 parts by weight of an organosilicone second moiety which is a silane-modified OH-endblocked predominantly dimethyl-substituted linear polysiloxane, is liquid at 20° C., and has a plurality of active hydrogen atoms each chemically bonded to a nitrogen or oxygen atom attached to a CH_2 group which is at least 3 carbon atoms distant from the nearest silicon atom, said nitrogen or oxygen atoms constituting no more than about 4% by weight of said organosilicone moiety.

4. The method of making a self-supporting sheet material capable of being wound convolutely upon itself in roll form, said sheet material affording accurately predictable and controllable release for a wide variety of normally tacky and pressure-sensitive adhesives, which method includes the steps of:
a. blending together in a mutually compatible solvent system components consisting essentially of
1. 98–50 parts by weight of a first moiety terminated with from more than 1 to not more than 3 isocyanate groups, liquid at 60° C., having an NCO equivalent weight of at least about 100, containing not more than 5 urethane or urea gram equivalents per 1000 grams of said moiety, and formed by reacting one or more poly-

isocyanates with one or more diols, triols, diamines or triamines, and

2. correspondingly 2–50 parts by weight of a second organosilicone moiety which is a silane-modified OH-endblocked predominantly dimethyl-substituted linear polysiloxane, is liquid at 20° C. and has a plurality of active hydrogen groups each chemically bonded to a nitrogen or oxygen atom attached to a CH_2 group which is at least 3 carbon atoms distant from the nearest silicon atom, said active hydrogen bearing atoms constituting no more than about 4% by weight of said organosilicone moiety, thereby forming a pourable liquid,

b. coating the pourable liquid in a thin stratum upon a substrate,

c. drying to remove the solvent, and

d. reacting the moieties.

3,997,703

MULTILAYERED MOLDED PLASTICS OF PULLULAN AND POLYMERS, PAPER OR ALUMINUM FOIL

Seizo Nakashio, Nishinomiya; Kozo Tsuji; Nobuhiro Toyota, both of Ibaragi; Fumio Fujita, Osaka, and Takami Sato, Toyonaka, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka and Hayashibara Biochemical Laboratories, Incorporated, both of, Japan, part interest to each

Filed Feb. 27, 1975, Ser. No. 553,677

Claims priority, application Japan, Mar. 1, 1974, 49-24388

Int. Cl.² B32B *15/04, 27/06*

U.S. Cl. 428—457 **9 Claims**

1. A multilayered molded plastic which comprises at least one layer comprising pullulan and at least one layer selected from the group consisting of layers composed of homopolymers and copolymers of olefins and/or vinyl compounds, polyesters, polyamides, celluloses, polyvinyl alcohols, rubber hydrochlorides, paper and aluminum foil.

3,997,704

PROCESS AND POLYVINYL CHLORIDE INTERPOLYMER COMPOSITION FOR COATING A MATERIAL AND THE PRODUCT THEREFROM

Joseph A. Aurichio, Bronx, N.Y., assignor to Stauffer Chemical Company, Westport, Conn.

Filed May 30, 1974, Ser. No. 474,747

Disclosure was also published under second Trial Voluntary Protest Program on Feb. 24, 1976

Int. Cl.² C08F *259/04*

U.S. Cl. 428—515 **20 Claims**

1. A process for coating a material to confer wear resistance thereto comprising applying to said material an effective amount of a coating composition which comprises an interpolymer formed by polymerizing an acrylate in the presence of a vinyl chloride containing polymer, formed by suspension polymerization, said interpolymer containing from about 50 % to 95%, by weight, vinyl chloride polymer and about 5% to 50%, by weight, of an acrylate, said vinyl chloride containing polymer having a particle size of from about 5 to about 150 microns.

3,997,705

METHOD OF COAGULATING A FLUORO-ELASTOMER FROM AN AQUEOUS DISPERSION THEREOF

Werner Trautvetter, Troisdorf-Spich, and Gregor Weisgerber, Konigswinter-Berghausen, both of Germany, assignors to Dynamit Nobel Aktiengesellschaft, Troisdorf, Germany

Filed July 8, 1975, Ser. No. 594,186

Claims priority, application Germany, July 11, 1974, 2433265; Oct. 1, 1974, 2446748

Int. Cl.² C08C *1/15, 3/00;* **C08F** *6/20, 8/30*

U.S. Cl. 526—27 **47 Claims**

1. A process for coagulating a fluoro-elastomer in an aqueous medium which comprises adding to an aqueous acidic medium thereof an organic base or salt thereof which acts as a vulcanization accelerator wherein said organic base of salt is secondary or tertiary aliphatic, cycloaliphatic, heterocyclic or araliphatic monofunctional amine having a boiling point of greater than 150° C, a quaternary aliphatic, cycloaliphatic, araliphatic or heterocyclic ammonium compound, a quaternary aliphatic, cycloaliphatic, araliphatic phosphonium compound or a mixture thereof.

3,997,706

PROCESS FOR THE CHLOROMETHYLATION OF STYRENE-DIVINYLBENZENE COPOLYMERS

Lucio Galeazzi, Borsano-Busto Arsizio (Varese), Italy, assignor to Montedison Fibre S.p.A., Milan, Italy

Filed Nov. 27, 1974, Ser. No. 527,839

Claims priority, application Italy, Nov. 29, 1973, 31929/73

Int. Cl.² C08F *8/24*

U.S. Cl. 526—41 **3 Claims**

1. A process for the chloromethylation of styrene-divinylbenzene copolymers by using a methylating agent, a chlorine donor and a catalyst, characterized in that the copolymer to be chloromethylated is treated in either the presence or absence of swelling agents, and of inert dispersants, with a mixture of methylal and thionyl chloride in the presence of a Friedel-Crafts type catalyst or of a catalyst consisting of an acid, the methylal/thionyl chloride ratio being comprised between 0.5:1 and 2:1.

3,997,707

METHOD FOR SUSPENSION-POLYMERIZING VINYL CHLORIDE

Shiro Aruga; Kazuaki Nakano, and Seigo Ishibashi, all of Minamata, Japan, assignors to Chisso Corporation, Osaka, Japan

Filed Apr. 25, 1975, Ser. No. 571,449

Claims priority, application Japan, Apr. 26, 1974, 49-47271

Int. Cl.² C08F *2/18, 14/06*

U.S. Cl. 526—62 **16 Claims**

1. In the suspension-polymerization of vinyl chloride monomer or a mixture thereof with another kind of vinyl monomer in an aqueous medium, in the presence of a suspension agent and an oil soluble polymerization initiator, the improvement which comprises carrying out the suspension polymerization in a polymerization vessel in the presence of at least one member selected from the group consisting of oxalic acid and its inorganic salts, said member being present in an amount effective to prevent the adhesion of scale form polymer to the inside wall of the polymerization vessel.

3,997,708

ORGANOCALCIUM PYRIDINE-TYPE POLYMERIZATION INITIATORS

James D. Brown, and Carl A. Uraneck, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Continuation-in-part of Ser. No. 790,429, Jan. 10, 1969, abandoned. This application Feb. 12, 1974, Ser. No. 441,773

Int. Cl.² C08F *4/44*

U.S. Cl. 526—183 **26 Claims**

1. A polymerization process which comprises reacting under solution polymerization conditions and temperatures a polymerizable monomer with an effective initiating amount of an organocalcium polymerization initiator prepared by the process which comprises contacting substantially pure calcium metal with a pyridinetype compound in a hydrocarbon or ethereal diluent or mixture, in the substantial absence of oxygen and ammonia,

wherein said pyridine-type compound is selected from the group consisting of pyridines, bipyridines, and polycyclic fused-ring aromatic compounds wherein at least one of said fused rings is a pyridine ring and the remainder of

said rings are carbocyclic rings, wherein the number of carbon atoms of said pyridine-type compound is in the range of 5 to 40,

employing a ratio of gram atoms of said calcium metal to moles of said pyridine-type compound in the range of about 1:1 to 25:1, and

wherein said polymerizable monomer contains 3 to 20 carbon atoms per molecule and is an α,β-unsaturated nitrile, alkyl, cycloalkyl, and aralkyl ester of acrylic and methacrylic acid, vinyl ketone, vinylpyridine, vinylquinoline, vinylpyrrolidone, or vinyl ester of a hydrocarbon monocarboxylate.

3,997,709

POLYMERIZATES OF OLEFINIC NITRILES

Walid Y. Aziz, Warrensville; Lawrence E. Ball, Cuyahoga Falls, and George S. Li, Aurora, all of Ohio, assignors to Standard Oil Company, Cleveland, Ohio

Filed Dec. 24, 1975, Ser. No. 644,123

Int. Cl.² C08F 234/02

U.S. Cl. 526—280 6 Claims

1. The terpolymer composition resulting from the copolymerization in an aqueous medium with a free-radical initiator in the substantial absence of oxygen of

A. from about 60 to 90% by weight of at least one nitrile having the structure

$$CH_2=\underset{\displaystyle R}{\overset{|}{C}}-CN$$

wherein R is hydrogen, a lower alkyl group having from 1 to 4 carbon atoms, or a halogen,

B. from about 10 to 39% by weight of isobutylene, and

C. from about 1 to 15% by weight of at least one member selected from the group consisting of indene and coumarone

wherein the given percentages of (A), (B), and (C) are based on the combined weight of (A), (B), and (C).

3,997,710

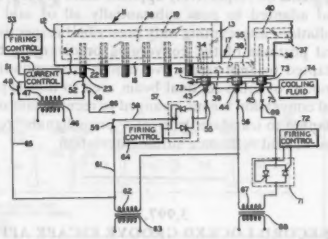
GLASS FURNACE HAVING ELECTRICALLY HEATED SUBMERGED THROAT AND METHOD OF OPERATION

John F. Maddux, Heath, Ohio, assignor to Owens-Corning Fiberglas Corporation, Toledo, Ohio

Filed Sept. 16, 1974, Ser. No. 506,152

Int. Cl.² C03B 5/02

U.S. Cl. 13—6 6 Claims



1. A glass melting and forming system comprising a glass melter in which glass is raised to a temperature above that at which it is to be formed; a conditioning chamber in which glass is brought to a temperature at which it is to be formed; a submerged throat of limited cross section for conveying molten glass from said melter to said conditioning chamber, said throat having the characteristic that in the absence of the application of heat the molten glass is cooled in the throat at a more rapid rate than molten glass is cooled in the melter in the absence of the application of heat; a first upstanding, rod-like electrode in said melter adjacent said throat; a second upstanding, rod-like electrode in said throat; a source of electrical power including a first power supply connected between said first and second electrodes; a second power supply; and means to selectively connect said first and second power supplies in series aiding, in phase relationship, whereby said selectively connected supplies have the capacity to develop sufficient heat by Joule effect heating in the molten glass to maintain in a molten state molten glass which is contained in said throat and subject to the cooling rate of said throat.

3,997,711

REDUCTION FURNACE CONTROL

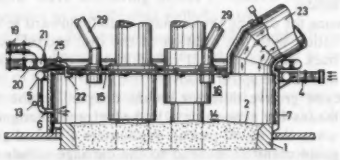
Heinz Stark, Essen, and Heribert König, Duisburg, both of Germany, assignors to Demag Aktiengesellschaft, Duisburg, Germany

Filed July 28, 1975, Ser. No. 599,811

Claims priority, application Germany, Aug. 2, 1974, 2437245

Int. Cl.² F27D 7/00

U.S. Cl. 13—9 R 15 Claims



6. Apparatus for controlled flue gas combustion in a closed arc reduction furnace, and having a closed furnace chamber covered by a hood with an exhaust gas flow, a source of combustion air, a source of cooled inert or low oxygen containing gas, and flow communication means between said gas and air sources and said chamber, characterized by

a. a plurality of wide angled air jet nozzles connected to said air flow communication means and spaced apart circumferentially around said chamber wall at a point spaced from the floor and ceiling thereof, said point being adjacent the upper surface of materials to be reduced therein;

b. a plurality of wide angled gas jet nozzles connected to said gas flow communication means and spaced apart circumferentially around said chamber wall immediately adjacent the ceiling thereof;

c. means in said air flow communication means for controlling the quantity of combustion air supplied to said air jet nozzles; and

d. means in said gas flow communication means for controlling the quantity of gas supplied to said gas jet nozzles.

3,997,712

ELECTRIC ARC FURNACE

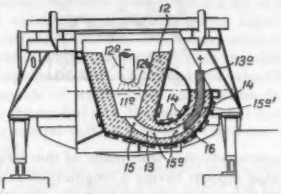
Sven-Einar Stenkvist, Vasteras, Sweden, assignor to Allmanna Svenska Elektriska Aktiebolaget, Vasteras, Sweden

Filed June 17, 1975, Ser. No. 587,714

Claims priority, application Sweden, June 19, 1974, 7408067; Dec. 19, 1974, 7416094

Int. Cl.² H05B 7/00

U.S. Cl. 13—9 8 Claims



1. An electric arc furnace comprising a hearth having an inside and outside for containing a melt on its inside, an electrode positioned to form an arc between the electrode and a melt in the hearth when the electrode and melt have connections with an electric power source, an electric melt connection comprising at least one elongated metal connector having inner and outer ends and a refractory enclosure exposing the inner end for contact with and melting by a melt in said hearth, and cooling means for cooling the connector at least between its inner and outer ends for removing heat therefrom at a rate preventing the connector from melting throughout its length to its outer end, said connector being curved upwardly from its inner end to its outer end so that its outer end is not substantially lower than the level of a melt when contained by said hearth while its inner end is substantially below said level.

3,997,713

INSULATED WIRE OR CABLE

Robert J. Turbett, Millington, N.J., assignor to Union Carbide Corporation, New York, N.Y.

Division of Ser. No. 312,033, Dec. 4, 1972, Pat. No. 3,826,781. This application Feb. 19, 1974, Ser. No. 443,492

Int. Cl.² H01B 7/28

U.S. Cl. 174—23 C 1 Claim

1. Insulated wire or cable having primary insulation between copper conductor and moisture barrier filler and wherein said primary insulation comprises

solid ethylene polymer having a density of about 0.928 to 0.955,

copper deactivating amounts of N,N'-dibenzal-(oxalyl dihydrazide), and

antioxidant effective quantities of 1,3,5-trimethyl-2,4,6-tris(3,5-di-t-butyl-4-hydroxybenzyl)benzene.

3,997,714

SUPERCONDUCTIVE LEAD HAVING THIN STRIPS

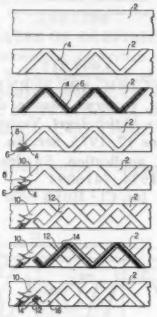
Bernard Letellier, Antony, and Jean-Claude Renard, Chilly Mazarin, both of France, assignors to Compagnie Generale d'Electricite, Paris Cedex, France

Filed May 14, 1975, Ser. No. 577,793

Claims priority, application France, May 29, 1974, 74.18587

Int. Cl.[2] H01B *7/08, 12/00*

U.S. Cl. 174—34 **13 Claims**



1. A superconductive lead made of thin strips comprising: an elongated support having a longitudinal axis; and a superconductive filament having the form of a thin strip fixed on the surface of said support with a longitudinal direction inclined at least in places with respect to the longitudinal axis of that support; a thin internal conductive strip and a thin external conductive strip of a highly conductive metal and colinear with said filament, one strip being fixed between the internal face of said filament and said support, and the other strip being fixed to the external face of said filament, respectively.

3,997,715

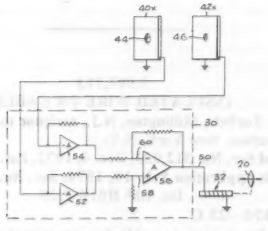
FOCUSING SYSTEM FOR VIDEODISC PLAYER

James E. Elliott, San Pedro, Calif., assignor to MCA DiscoVision, Inc., Universal City, Calif.

Filed Mar. 25, 1974, Ser. No. 454,130

Int. Cl.[2] H04N *5/76*

U.S. Cl. 178—6.6 DD **15 Claims**



1. Apparatus for determining deviation of an information bearing, reference surface from a prescribed reference position with respect to a prescribed remote reference point, this apparatus comprising in combination:

a source of radiation adapted to direct prescribed radiation at the subject reference surface so as to be affected by the information and reflected from the surface toward said reference point;

radiation focusing means arranged and adapted to be interposed along the radiation path between said surface and said point so as to focus said radiation into a beam convergingly to provide a prescribed reference focal plane therebetween with converging and diverging beam portions respectively on either side of this focal plane;

radiation beam interrupting means including sensing means arranged along this reflecting path having first and second elements on respectively opposite sides of said focal plane and adapted to pass substantially all of said reflected radiation, intercepting only prescribed respective peripheral portions of the converging or diverging beam and adapted to emit respective signals corresponding to the amount of cross-sectinal beam area so intercepted; and

signal conversion means arranged to receive said signals and adapted to translate them into "error signals" representative of said reference surface deviation.

3,997,716

DISC RECORD LOCKED GROOVE ESCAPE APPARATUS

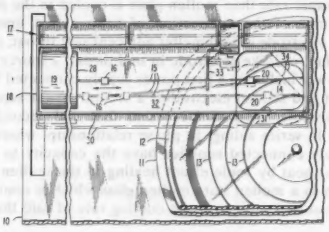
Byron Kent Taylor, Indianapolis, Ind., assignor to RCA Corporation, New York, N.Y.

Division of Ser. No. 562,730, March 27, 1975, Pat. No. 3,961,131. This application Nov. 21, 1975, Ser. No. 634,234

Claims priority, application United Kingdom, Feb. 28, 1975, 8405/75

Int. Cl.[2] H04N *5/76;* **G11B** *9/06, 17/00*

U.S. Cl. 178—6.6 DD **2 Claims**



1. In a system for playing back signals from a spirally grooved disc record by a groove-engaging signal pickup secured to a pickup arm when relative speed is established therebetween, the playback system including a base, and transducer means for varying the position of the signal pick up in relation to the disc record groove in a manner that opposes deviations of the relative speed from a predetermined speed; a locked groove escape apparatus comprising:

a carriage housing the pickup arm mounted on the base for movement between a playback mode and a standby mode;

means for driving the carriage radially inward in synchronization with the rotation of the disc record during playback independent of radial motion of the signal pickup due to the spiral groove;

locked groove detector means coupled to the transducer means for generating a locked groove recognition pulse when the signal pickup encounters a locked groove;

a guide member secured to the carriage adjacent the free end of the pickup arm, wherein the location of the guide member is such that the pickup arm does not engage the guide member during normal operation of the transducer means in a manner that opposes the deviations of the relative speed from the predetermined speed; and such that when the transducer means drives the pickup arm in response to the locked groove recognition pulse against the guide member radially inward movement of the pickup arm is effected, whereby the signal pickup is relieved from the locked groove.

3,997,717

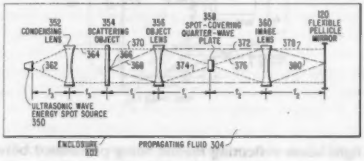
ULTRASONIC WAVE RADIATION PATTERN DISPLAY SYSTEM INCORPORATING PHASE CONTRAST MEANS

Reuben Saul Mezrich, Rocky Hill, and David Herman Raphael Vilkomerson, South Brunswick, both of N.J., assignors to RCA Corporation, New York, N.Y.

Continuation of Ser. No. 576,605, May 12, 1975, abandoned. This application Feb. 2, 1976, Ser. No. 654,602

Int. Cl.² G01N 9/24; H04N 7/18

U.S. Cl. 178—6.8 8 Claims



1. In an ultrasonic wave radiation pattern display system in which the radiation pattern manifested by a flexible pellicle mirror insonified by ultrasonic wave energy of a first given frequency is displayed on a cathode ray tube; said system including a detection means responsive to the illumination thereof with first and second components of coherent light of predetermined wavelength λ for intensity modulating the electron beam of said cathode ray tube with an output signal substantially proportional to a peak phase change at said first given frequency in said interfering first and second light components, an interferometer comprising a rigid reference mirror for reflecting said first light component and said flexible pellicle mirror for reflecting said second light component from a spot thereof, wherein the round-trip optical path length of said first light component reflected from said rigid reference mirror is wiggled at a second given frequency by an amount which is greater than λ/2, said second given frequency being significantly lower than said first given frequency, and wherein said second light component reflected from said spot of said flexible pellicle mirror and the electron beam of said cathode ray tube are respectively scanned over the surface of said flexible pellicle mirror and the screen of said cathode ray tube in synchronism with each other to thereby display said radiation pattern; the improvement comprising:

a. first means including an ultrasonic wave propagating fluid in which is immersed said flexible pellicle mirror and an ultrasonic wave scattering object in spaced relationship with respect to said flexible pellicle mirror,

b. second means for insonifying said object with ultrasonic wave energy having a predetermined wavefront to derive a beam of unscattered ultrasonic wave energy having said predetermined wavefront and scattered ultrasonic wave energy emanating from scattering points of said object, and

c. phase shift means situated intermediate said object and said flexible pellicle mirror for phase shifting said beam of unscattered ultrasonic wave energy by substantially an odd multiple of 90° relative to said scattered ultrasonic wave energy,

d. whereby said radiation pattern manifested by said insonified flexible mirror comprises an ultrasonic wave intensity pattern formed by algebraic addition of said phase shifted unscattered and said scattered ultrasonic wave energy then insonifying said flexible pellicle mirror.

3,997,718

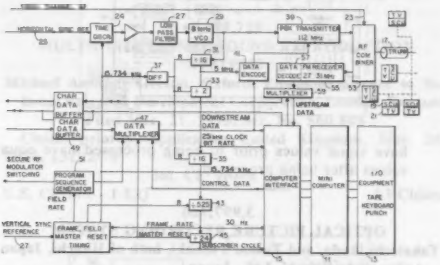
PREMIUM INTERACTIVE COMMUNICATION SYSTEM

Luther W. Ricketts, and Paul M. Dormans, both of Fort Wayne, Ind., assignors to The Magnavox Company, Fort Wayne, Ind.

Continuation-in-part of Ser. No. 328,818, Feb. 1, 1973, abandoned. This application Nov. 11, 1974, Ser. No. 522,795

Int. Cl.² H04H 1/02

U.S. Cl. 178—6.8 10 Claims



1. In a subscriber television system having a central unit and a plurality of subscriber units interconnected by at least one tree-organized wideband communication link capable of simultaneously carrying a plurality of communication channels, certain channels of which carry information including a plurality of video signals from the central unit to subscriber units and other channels of which carry information from subscriber units to the central unit, the improvement comprising:

means at the central unit for providing reference synchronizing signals;

means at the central unit for transmitting pulses over at least one of the certain channels which pulses are provided a reference by the synchronizing signals;

means at the central unit for periodically transmitting a reset signal;

means at each subscriber unit for counting the transmitted pulses;

means at each subscriber unit and responsive to a received reset signal for returning the corresponding counting means to an initial count;

means at each subscribing unit for providing a subscriber unit enabling signal in response to a predetermined count by the counting means, the predetermined count being different for different subscriber units; and

means at the central unit for transmitting a plurality of video signals, at least one said video signal being synchronized to the reference synchronizing signal.

3,997,719

BI-LEVEL DISPLAY SYSTEMS

Charles Norris Judice, Lincroft, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Mar. 19, 1975, Ser. No. 560,505

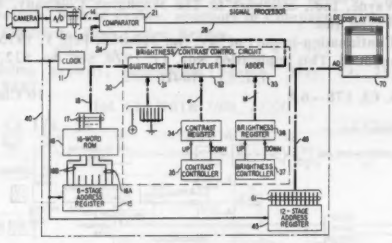
Int. Cl.² H04N 5/70; G08B 23/00

U.S. Cl. 178—7.3 D 26 Claims

1. In a system for displaying a continuous-tone image, said system including a panel of selectively energizable bi-level display cells, means for assigning a respective threshold to each of said cells, and means for selecting ones of said cells for energization in response to comparisons between the intensities of elements of said image and respective ones of said thresholds, said assigning means includng means for assigning said thresholds such that the energization of said ones of said cells substantially maps the intensities of regions of said continuous-tone image into correspondingly bright regions of said panel,

a method for varying the characteristics of the displayed continuous-tone image comprising the step of processing

selected ones of said thresholds to change the values thereof in such a way that all processed thresholds which



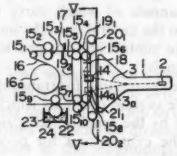
have equal values prior to being processed have equal values after being processed.

3,997,720

OPTICAL PICTURE RECORDING SYSTEM

Takatoshi Ikeda, and Toshio Tsubaki, both of Hitachi, Japan, assignors to Hitachi, Ltd., Japan

Filed Apr. 16, 1974, Ser. No. 461,430
Claims priority, application Japan, Apr. 18, 1973, 48-43152
Int. Cl.² H04N *1/22*
U.S. Cl. 178—7.4 **6 Claims**



1. An optical picture recording system comprising

a cathode ray tube having a fluorescent screen upon which a picture is formed by a scanning electron beam;

a recording medium having a surface upon which an image of said picture can be recorded in response to said scanning electron beam of said cathode ray tube;

a linear lens, disposed between said cathode ray tube and said recording medium, through which said image is projected from said cathode ray tube toward said recording medium prior to being recorded on said surface of said recording medium; and

means for synchronously moving one of said cathode ray tube and said linear lens relative to the other such that said linear lens continually confronts said scanning electron beam from said cathode ray tube,

wherein said means for moving enables said linear lens to move and said cathode ray tube to remain stationary, and

wherein said means for moving includes potentiometer means for detecting the position of said linear lens so that the movement of said linear lens can be synchronized with the movement of said scanning electron beam in a predetermined manner.

3,997,721

FLYING SPOT SCANNING SYSTEM WITH REDUCED EFFECTIVE SCAN ANGLE

William Streifer, Palo Alto, Calif., assignor to Xerox Corporation, Stamford, Conn.

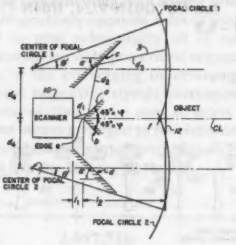
Filed Nov. 21, 1974, Ser. No. 525,696
Int. Cl.² H04N *1/10*
U.S. Cl. 178—7.6 **9 Claims**

1. An optical scanning system for scanning a surface comprising:

means for providing a beam of light,

scanning means for directing said beam of light throughout a predetermined scan angle,

light beam focusing means and light beam reflecting means for providing at least a pair of contiguous focal circles proximate said surface as said beam of light is scanned through said predetermined scan angle,



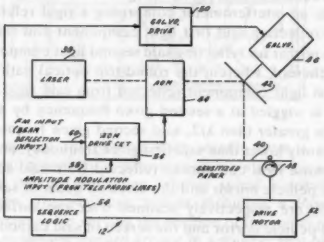
said light beam reflecting means being positioned between said scanning means and said surface and symmetrical with a center-line which bisects said predetermined scan angle such that the effective scan angle of each of said focal circles is less than said predetermined scan angle whereby focal plane errors are reduced.

3,997,722

FACSIMILE REPRODUCTION SYSTEM

Andrew Miklos Bardos, Palm Bay, Fla., assignor to The Associated Press, New York, N.Y.

Continuation of Ser. No. 540,663, Jan. 13, 1975, abandoned.
This application Sept. 10, 1975, Ser. No. 611,904
Int. Cl.² H04N *3/08*, *3/10*
U.S. Cl. 178—7.6 **20 Claims**



1. A facsimile system comprising:

a transmitter including: means for scanning an image to be reproduced; means for generating an electrical energy signal the intensity of which varies in correspondence to density variations in the image scanned; and means for transmitting said electrical signal to a receiver; and,

a receiver including: a laser having a beam focused on a sheet of sensitized paper; a sheet of light sensitized paper; means for scanning said laser beam across said sheet to produce a scan line, the variations in the exposure of the paper corresponding to the intensity of said laser beam; an acousto-optic modulator cell means interposed between said laser and paper to modulate the intensity of said laser beam in response to variations in an applied electrical signal; means for applying said transmitter electrical energy signal to said optical cell on an rf carrier; and,

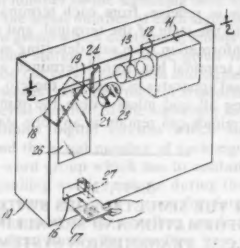
means for cyclically varying the frequency of said carrier whereby to deflect said laser beam substantially between the top and bottom of said scan line in an undulating path generally transverse to the direction of scan.

3,997,723

COMPACT UNIT FOR OPTICAL SECURITY SYSTEM

Walter T. Sandin, Old Tappan, N.J., assignor to Visual Methods, Inc., Montvale, N.J.

Filed Aug. 19, 1974, Ser. No. 498,405
Int. Cl.² H04N 7/18
U.S. Cl. 178—7.8 13 Claims



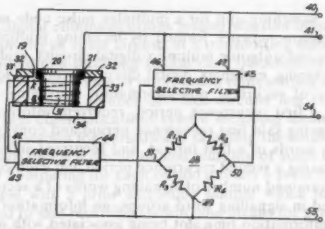
1. A composite image producing system including:
a housing;
a first lens, mounted in said housing and having an optical axis, for forming the image of a first object in a first focal plane; said first object being located at a first predetermined position to a first side of said optical axis;
a second lens, mounted in said housing, for forming the image of a second object in a second focal plane which includes said optical axis; said second object being located at a second predetermined position; said second focal plane intersecting said first focal plane at a line of intersection; and
a first mirror; said first mirror having an edge; said first mirror being mounted in said housing with said edge at said line of intersection and to a second side of said optical axis.

3,997,724

LOUDSPEAKER DRIVE MECHANISM MONITORING ASSEMBLY

Frederick L. Seebinger, Smoke Rise, N.J., assignor to American Trading and Production Corporation, Baltimore, Md.

Filed June 3, 1975, Ser. No. 583,372
Int. Cl.² H04R 29/00
U.S. Cl. 179—1 MN 3 Claims



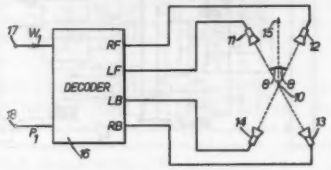
1. A loudspeaker drive mechanism monitoring assembly comprising in combination, permanent magnet means defining an air gap having a flux field therein, voice coil means adapted to receive a drive signal applied thereto, said voice coil being disposed in said flux field to effect a change thereof in response to a drive signal applied to said voice coil, detection coil means wrapped around said permanent magnet means, said detection coil means having a detection signal induced therein in response to the application of a drive signal to said voice coil, said detection signal being representative of an operative state of said loudspeaker drive mechanism and a detection circuit having a first circuit means coupled to said voice coil means for sensing a signal applied thereto, second circuit means coupled to said detection coil means for sensing the detection signal induced therein, and comparator means coupled to said first and second circuit means for comparing the respective signals sensed thereby, and producing a singal representative of an operative condition of said loudspeaker drive mechanism.

3,997,725

MULTIDIRECTIONAL SOUND REPRODUCTION SYSTEMS

Michael Anthony Gerzon, Oxford, England, assignor to National Research Development Corporation, London, England

Filed Mar. 21, 1975, Ser. No. 560,865
Claims priority, application United Kingdom, Mar. 26, 1974, 13292/74
Int. Cl.² H04R 5/00
U.S. Cl. 179—1 GQ 13 Claims



11. A decoder for a sound reproduction system comprising output means for providing output signals for at least three loudspeakers surrounding a listening position, input means for receiving at least two input signals comprising pressure signal components representative of the sum of the desired output signals and velocity signal components representative of the desired velocity of the sound field at said listening position and gain adjustment means between the input means and the output means and arranged to apply frequency dependent relative gains to said pressure and velocity signal components such that the gain applied to pressure signal components of frequencies substantially above a predetermined frequency divided by the gain applied to velocity signal components of frequency substantially above said predetermined frequency is greater than the gain applied to pressure signal components of frequency substantially below said predetermined frequency divided by the gain applied to velocity signal components of frequencies substantially below said predetermined frequency.

3,997,726

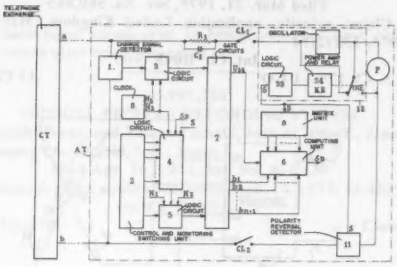
COIN TELEPHONE SET

Edouard de Crepy, Paris, France, assignor to Societe Anonyme Francaise des Appareils Automatiques, Taximeteres-Taxiphones "SAFAA", Paris, France

Filed May 19, 1975, Ser. No. 578,748
Claims priority, application France, May 24, 1974, 74.18095
Int. Cl.² H04M 17/02
U.S. Cl. 179—6.3 R 12 Claims

1. A coin telephone set comprising a telephone station adapted to be connected to two wires of a telephone line from a telephone exchange, a call charge signal detecting circuit connected in parallel to the telephone station, an assembly of control and monitoring switching means operable by coins, logic circuits for processing output signals from said call charge signal detecting circuit and output signals from the assembly of control and monitoring switching means, and a computing unit interconnected to the logic circuits for keeping current the account of the user of the telephone set from

the moment the latter is connected to the desired telephone subscriber, said computing unit comprising a series of D-type flip-flops having each a clock input, a signal input, a resetting input, a setting input and an output, and a series of elementary adders equal in number to said D-type flip-flops, each adder being associated with a respective one of the D-type flip-flops having the same order number in the series, and having a first input connected to the output of the associated D-type flip-flop of the series, a second input for receiving from the logic circuits a respective one of the bits of a code q of an information p (p being a positive, negative or zero integer representing an amount of money to be carried to the credit or debit of the user's account), said respective one bit having a weight i ($i = 1, 2, \ldots n+1$) equal to the order number of the considered elementary adder, and said code q being defined as follows:



$q = C_p$ when $p \geq 0$

$q = C_a - C_p$ when $p < 0$

wherein n is a minimum interger such that:

$$2^n - 1 \geq p \geq -2^n$$

and wherein C_a and C_p are the pure binary coded expressions of 2^{n+2} and of the absolute value of the information p on $(n+1)$ digits, each elementary adder further comprising a carry input for receiving a carry output signal from the next precedingelementary adder in the series, a carry output connected to the carry input of the next succeeding elementary adder in the series, and an output connected to the signal input of the associated D-type flip-flop for applying thereto a signal representing the sum of the signals applied to the first, second and carry inputs of the considered elementary adder.

3,997,727

TIME DIVISION MULTIPLEXED DIGITAL SWITCHING APPARATUS

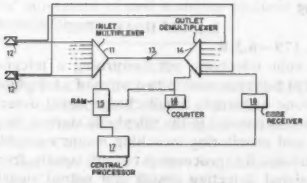
John Charles Platts, Doncaster; Trevor Ross Geisler, Melbourne; Keith Harwood, Brunswick, and Christopher Gerald Sheahan, Glenroy, all of, Australia, assignors to L M Ericsson Pty. Ltd., Australia

Filed Nov. 13, 1973, Ser. No. 415,424

Claims priority, application Australia, Nov. 13, 1972, 1198/72

Int. Cl.² H04J *3/00*

U.S. Cl. 179—15 AQ **15 Claims**



1. A synchronous digital data switching apparatus including a congestionless digital switch having a plurality of digital data inlets and a plurality of digital data outlets connected thereto, said switch being adapted to transfer digital data from any inlet to any one or more outlets using time division multiplexing, an active digital data terminal connected to each inlet and adapted to send synchronous digital data to each inlet respectively, said terminals also being adapted to continuously transmit digital data relevant to their state at any particular time, time division multiplexed detecting means for cyclicly scanning said inlets to receive, from each terminal in turn, said data relevant to the state of the terminal, and control means for receiving information from said detecting means when the condition of a terminal has been determined and controlling operation of said apparatus in response thereto, said detecting means scanning all said inlets within the minimum time in which said terminals can remain in any one state.

3,997,728

UNIT FOR THE SIMULTANEOUS SWITCHING OF DIGITAL INFORMATION AND SIGNALLING DATA IN P.C.M. TRANSMISSION SYSTEMS

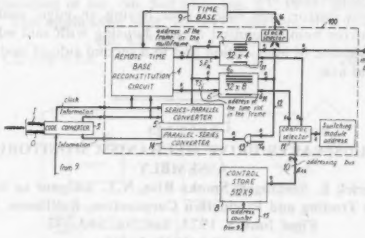
Jean F. Duquesne, 32, Rue Lafontaine, Paris, France (75016); Michel M. Rouzier, Saint Quay Perros; Maurice J. Revel, Rue de Lanneg-Braz, both of Perros-Guirec, France (22700), and Olivier F. Louvet, 82, Residence Corlay, Lannion, France (22300)

Filed Aug. 25, 1975, Ser. No. 607,486

Claims priority, application France, Aug. 30, 1974, 74.29670

Int. Cl.² H04J *3/06*

U.S. Cl. 179—15 BY **3 Claims**



1. A switching unit for a multiplex pulse code modulation transmission network formed by incoming multiplex digital circuits and outgoing multiplex digital circuits, said incoming and outgoing multiplex digital circuits being divided into a number of recurrent non-information conveying time slots having a first recurrence period, recurrent information time slots having said first recurrence period and conveying information words of a first format, and recurrent signalling time slots having a second recurrence period and each conveying a predetermined number of signalling words of a second format grouped in signalling word groups, an information word in a given information time slot being associated with a signalling word in a given signalling time slot for forming the information data and the signalling data of one and the same given component digital channel and the number of signalling words in a signalling word group being one unit higher than the number of non-information conveying time slots, said switching unit comprising information stores connected to said incoming and outgoing multiplex digital circuits, signalling stores connected to said incoming and outgoing multiplex digital circuits, means for writing in said information stores the information words contained in the information time slots of said incoming multiplex digital circuits at addresses dependent on the serial number of the information time slots which convey them, means

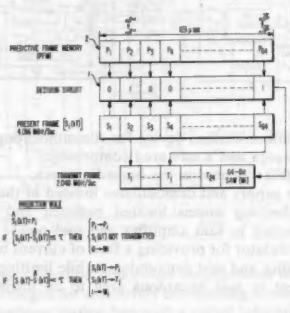
for reading out of said information stores, at a given rate, the information words contained therein at addresses dependent on the serial number of the information time slots of the outgoing multiplex digital circuits which they are to be switched to, means for writing in said signalling stores the signalling words contained in the signalling time slots of said incoming multiplex digital circuits at addresses dependent on both the serial number of the signalling time slots which convey them and the serial number of each signalling word in the signalling word group which contains it, means for reading out of said signalling stores, at the same given rate, during the non-information conveying time slots and signalling time slots, the signalling words contained therein at addresses depending on both the serial number of the signalling time slots of the outgoing multiplex digital circuits which they are to be switched to and the serial number of each signalling word in the signalling word group which has to contain it, means for storing the signalling words read out during the non-informative conveying time slots and means for forming signalling word groups from said stored signalling words and said signalling words read out during the signalling time slots.

3,997,729

PSEUDO-RANDOM SEQUENCING FOR SPEECH PREDICTIVE ENCODING COMMUNICATIONS SYSTEM

René Costales, and Joseph Albert Sciulli, both of Rockville, Md., assignors to Communications Satellite Corporation (Comsat), Washington, D.C.

Filed July 25, 1975, Ser. No. 599,228
Int. Cl.² H04J *6/02*
U.S. Cl. 179—15 AS **6 Claims**



1. In a digital communications system wherein information from a plurality of voice circuits at a transmitting station may be transmitted to a receiving station via a transmission path as a digitally encoded frame of information representing a predetermined maximum number of voice circuits less than said plurality, said communications system including means at the transmitting station for periodically sampling the amplitude of voice signals on each circuit of said plurality of voice circuits, means for comparing for each of said circuits a present amplitude sample with a prior amplitude sample which has been transmitted to said receiving station, and means for generating a transmission frame comprising a digital representation of those present amplitude samples which differ from the corresponding prior amplitude samples by a predetermined amount, the improvement comprising:

means for pseudo-randomly changing the order by which all voice circuits are serviced during successive transmission frames, and

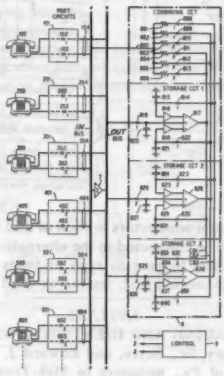
means for generating as part of said transmission frame a digital sample assignment word representing all voice circuits in the pseudo-random servicing sequence of that frame and identifying those circuits having digital representations of present amplitude samples included in the frame.

3,997,730

TIME DIVISION CONFERENCE CIRCUIT

James Richard Stidham, Broomfield, Colo., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Aug. 29, 1975, Ser. No. 609,038
Int. Cl.² H04M *3/56*
U.S. Cl. 179—18 BC **12 Claims**



1. A conference circuit for use in a time division switching system having a plurality of time slots occurring in repetitive cycles, an incoming and an outgoing time division bus, a plurality of conferee stations selectively connectable in groups to said incoming bus during distinct conference time slots of said plurality of time slots for transferring output signals to said incoming bus and being selectively connectable to said outgoing bus for receiving input signals from said outgoing bus, said circuit comprising:

a plurality of storage means, each of said storage means being operative during a different one of said conference time slots and being responsive to signals on said outgoing bus for storing a conference communication signal equal to the output signal produced by a station group connected to said outgoing bus during said one different conference time slot; and

combining means operative during said one different conference time slot and responsive to conference communication signals stored by said storage means for summing conference communication signals stored by said storage means during other time slots and applying the resulting sum to said incoming time division bus.

3,997,731

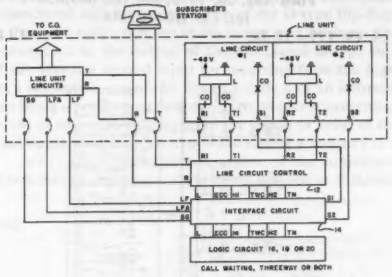
APPARATUS FOR CUSTOM CALLING FEATURES IN A TELEPHONE SYSTEM

Charles David Wilmot; William Lee Webb, both of Milan, and Kervyn George Collyer, Humboldt, all of Tenn., assignors to International Telephone and Telegraph Corporation, New York, N.Y.

Filed Apr. 14, 1975, Ser. No. 567,485
Int. Cl.² H04M *3/42*
U.S. Cl. 179—18 B **7 Claims**

1. Apparatus for providing special service features of a first, or second or first and second type for a telephone system wherein said apparatus may be provided for a telephone station and line having access to said telephone system through an intermediate distributing interconnection, said apparatus including means insertable into said system at said interconnection to provide services to the line to which connected, said apparatus including a control circuit interfacing between said line and line equipment in said system, said control circuit

including a plurality of control conductors, a first circuit for providing said first type of special sevice feature, a second circuit for providing said second type of service, and a third circuit for providing both said first and said second type of



service, and plural conductors in each of said first, second and third circuits to be connected in the alternative to said control circuit conductors to provide type or types of service indicated by the connected first, second or third circuit.

3,997,732

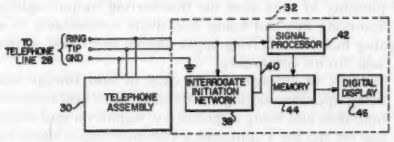
CALL TRACING AND IDENTIFICATION SYSTEM

Robert H. Every, Sr., Sayre, and Edward J. McCabe, Wellsboro, both of Pa., assignors to Mek-Tronix Laboratories Corporation, Sayre, Pa.

Continuation-in-part of Ser. No. 268,670, July 3, 1972, Pat. No. 3,904,830. This application Sept. 5, 1975, Ser. No. 610,741

Int. Cl.[2] H04M *1/57*

U.S. Cl. 179—18 FH 10 Claims



1. A call tracing and identification system for a telephone system connected to a calling-party telephone line and a called-party telephone line, said tracing and identification system comprising

encoder means associated with the calling-party telephone line for applying a train of sine wave bursts to the called party telephone line,

said bursts each having a selected number of sine wave cycles such that the number of sine wave cycles in the bursts of the train identify the calling party,

a called-party telephone device connected to the called-party telephone line and including

a. means, including counting means, for receiving the train of sine wave bursts on the called-party telephone line, and

b. means responsive to the receiving means for producing a visual identification of the calling-party telephone line.

10. A call tracing and identification system for a telephone network connected to a calling-party telephone line and a called-party telephone line, said system comprising

encoder means, associated with the calling-party telephone line, for applying an identification signal identifying the calling-party telephone line to the called-party telephone line,

said encoder means including means responsive only to an interrogation signal having a first characteristic on the called-party telephone line for initiating operation of said encoder means; and

a called party telephone device connected to the called-party telephone line and including

a. interrogation means for generating and applying an interrogation signal having the first characteristic to the called-party telephone line, said interrogation means including means responsive to a ringing signal on the called party telephone line for initiating operation of the interrogation means, and means responsive to the called-party telephone device being answered for initiating operation of the interrogation means wherein said means responsive to the called-party telephone device being answered is responsive to a change in voltage conditions on the called party telephone line,

b. means for receiving the identification signal from the called-party telephone line, and

c. means responsive to the receiving means for producing a visual identification of the calling-party telephone line.

3,997,733

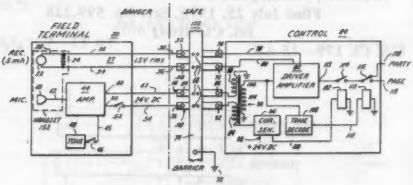
INTRINSICALLY SAFE COMMUNICATION SYSTEMS

David Albert Sanders, Houston, Tex., assignor to Browne-Davies Electronic Corporation, Houston, Tex.

Filed May 1, 1975, Ser. No. 573,626

Int. Cl.[2] H04M *1/00;* H02H *3/20*

U.S. Cl. 179—81 R 6 Claims



2. A communications device for communicating between a hazardous area and a safe area comprising:

an amplifier located in the hazardous area;

a power supply and demodulator located in the safe area;

power limiting means located between and electrically connected to said amplifier and said power supply and demodulator for providing a flow of current between said amplifier and said demodulator while limiting the flow of current in said hazardous area to an intrinsically safe level;

a dynamic microphone in said hazardous area capable of generating intrinsically safe telephonic output signals in response to audio frequency acoustic compression waves, said microphone being electrically connnected to said amplifier so the microphone's telephonic output signals modulate the current passing through the amplifier; and

a second amplifier responsive to said demodulator in said safe area that amplifies the signal to provide an amplified audio frequency output demodulated signal.

3,997,734

TELEPHONE HOLD ATTACHMENT

Louis W. Champan, Kent, Wash., assignor to Melco, Bellevue, Wash.

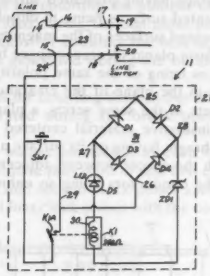
Filed Nov. 24, 1975, Ser. No. 634,598

Int. Cl.[2] H04M *1/00*

U.S. Cl. 179—81 R 7 Claims

1. A telephone hold circuit for connection to a telephone line having tip and ring conductors, comprising a bridge rectifier having respective pairs of input and output terminals, first circuit means including a manually operated momentary switch connecting said input terminals to said line conductors, a relay, voltage-responsive conducting means, second circuit means connecting the winding of said relay and said voltage-

responsive conducting means in series to said output terminals, said relay having a pair of normally open contacts, and



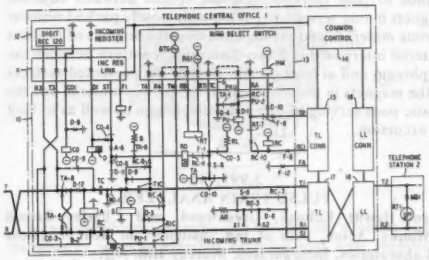
third circuit means connecting said contacts in shunt with said manually operated momentary switch.

3,997,735

TELEPHONE STATION MAKE-BUSY CIRCUIT

John Mason Catterall, Columbus, Ohio, assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Sept. 24, 1975, Ser. No. 616,284
Int. Cl.² H04M *3/42*
U.S. Cl. 179—84 C **10 Claims**



1. A telephone station make-busy arrangement for use with apparatus arranged for selectively establishing a connection of a calling telephone station line with a called telephone station line in an on-hook state comprising

means actuated by ringing signals applied to the called telephone station line for conditioning the called telephone station line to momentarily assume an off-hook state during occurrence of the ringing signals, and

means responsive to the off-hook state momentarily appearing on the called telephone station line for causing said apparatus to interrupt the established connection and apply a busy indication to the calling telephone station line.

3,997,736

PARALLEL CONTROL OF A TELEPHONE SWITCHING NETWORK

Patrick Henry Gorman, II, Little Silver, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Jan. 16, 1976, Ser. No. 649,749
Int. Cl.² H04M *11/00*
U.S. Cl. 179—18 C **10 Claims**

1. In a telephone communication system,

a plurality of stations,

a central switching network,

means for establishing communication connections from a calling one of said stations over a communication line from said calling station through said central switching network and over a communication line from said central switching network to a called one of said stations,

a second switching network independent from said central switching network, said second switching network arranged to establish second communication connections between calling and called ones of said stations,

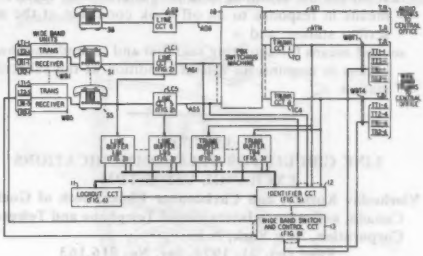
a control circuit for controlling the establishment of connections through said second switching network, said control circuit comprising

tone supplying means,

tone detecting means,

means for associating said tone detecting means with the communication lines of calling ones of said stations,

first identification means responsive to station ringing sig-



nals transmitted from said central switching network over any said communication line to a called one of said stations for identifying said called station,

means responsive to said identification of a called one of said stations for connecting said tone supplying means to said communication line of said identified called station,

second identification means controlled by an enabling of said tone detecting means for identifying one of said calling stations as the station connected through said central switching network to said identified called station, and

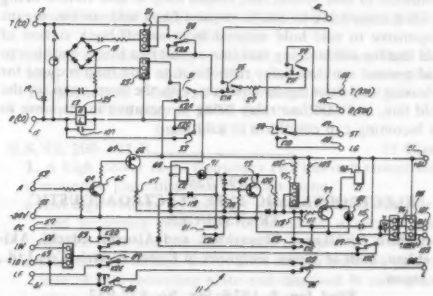
means controlled by said first and said second identification means for establishing a said second communication connection through said second switching network between said calling and said called stations.

3,997,737

SECURITY LINE CARD CIRCUIT

Arthur Gene Watkins, Santa Ana, Calif., assignor to San/Bar Corporation, Santa Ana, Calif.

Filed Nov. 27, 1974, Ser. No. 527,513
Int. Cl.² H04M *1/68*
U.S. Cl. 179—99 **28 Claims**



8. A line card circuit for insertion in the tip and ring lines between a central office and a key telephone subscriber station to provide supervisory control over said tip and ring lines and the operation of visual and audible indicators at the subscriber station, and isolate the central office tip and ring lines

from the subscriber station tip and ring lines, during on-hook and hold conditions at the subscriber station, comprising:

first means, normally in an open state, for connecting, upon actuation, the subscriber station tip line to the central office tip line;

second means, normally in an open state, for connecting, upon actuation, the subscriber station ring line to the central office ring line;

first means, normally in a closed state, for disconnecting, upon actuation, the subscriber station tip line from the central office tip line;

second means, normally in a closed state, for disconnecting, upon actuation, the subscriber station ring line from the central office ring line;

first means for actuating said first and second connecting means in response to an off-hook condition at the subscriber station; and

second means for actuating said first and second disconnect means in response to a hold condition at the subscriber station.

3,997,738

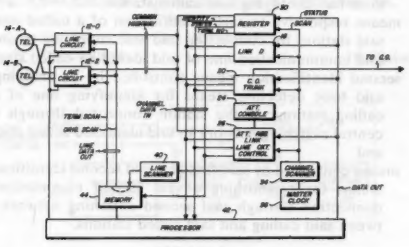
LINE CIRCUIT FOR TELECOMMUNICATIONS EXCHANGE USING TDM

Viacheslav Korsky, and Christopher Elmer, both of Guelph, Canada, assignors to International Telephone and Telegraph Corporation, New York, N.Y.

Filed Oct. 21, 1974, Ser. No. 516,163

Int. Cl.² H04J *3/02*

U.S. Cl. 179—99 **11 Claims**



4. A line circuit for providing line circuit functions for a line of a time division telephone system and for providing key telephone functions to the line of said line circuit, said line circuit including a line relay responsive only to closed loop condition at a station of said line for operating its contacts to complete a path for maintaining said line circuit in a busy condition to said system, the closed loop at said station being opened responsive to a hold request from said station, means responsive to said hold request from an off-hook station of said line for maintaining said line circuit in a busy condition to said system, said line relay responsive to said hold request for releasing and opening its contacts with the loop open on the held line, and said line relay being inoperative in response to an incoming call condition to said line.

3,997,739

ELECTRODYNAMIC TYPE ELECTROACOUSTIC TRANSDUCER

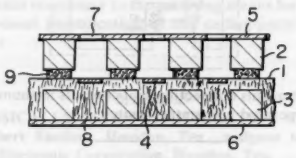
Kenichiro Kishikawa, Musashino, and Atsushi Adachi, Akishima, both of Japan, assignors to Foster Electric Co., Ltd., Japan

Filed Jan. 2, 1975, Ser. No. 537,952

Int. Cl.² H04R *9/02*

U.S. Cl. 179—115.5 PV **1 Claim**

1. An electrodynamic type electroacoustic transducer comprising a first series of permanent bar magnets arranged in a plane spaced parallel to one another and having presented surfaces and back surfaces and with the magnets polarized so that the presented surfaces provide poles of alternating polarity, a second similar series of permanent bar magnets arranged in a plane having presented surfaces and back surfaces, the presented surfaces being in closely spaced opposition to the presented surfaces of the magnets in the first series to define a uniform planar clearance space between them, the opposed surfaces being of the same polarity so that lines of flux are set up in the plane of the clearance space between adjacent magnets in the same series, a planar diaphragm of non-magnetic insulative material centered in the clearance space, the diaphragm having on its surface a series of conductors alined with the spaces between adjacent magnets, a pair of terminals, the conductors being so connected to one another and to the terminals that an alternating voltage applied across the terminals produces simultaneous movement of all of the conductors and hence the diaphragm toward and away from the presented surfaces of the magnets, soft iron plates secured to the back surfaces of the respective series of magnets, at least one of the plates being perforated for allowing sounds to pass therethrough, the spaces between adjacent magnets in one series being filled with loosely packed resilient fibrous material, and means including elastic pads of resilient material interposed in a two-dimensional pattern between the diaphragm and at least certain ones of the presented surfaces of the magnets in the other series, the fibrous material and the elastic pads serving to damp the diaphragm as well as to limit its excursion.



3,997,740

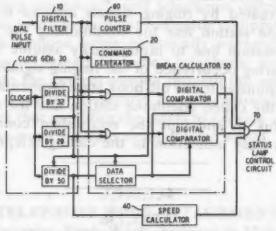
PULSE TRAIN ANALYZER

Carol Hewitt Eubank, Greenwood, and Charles Ronald Mimna, Acton, both of Ind., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed May 30, 1975, Ser. No. 582,372

Int. Cl.² H04M *3/08*

U.S. Cl. 179—175.2 A **10 Claims**



1. Testing apparatus for determining if the percent break ratio of a dial pulse is within or without a specified range of percent break ratios, said apparatus comprising:

a. a first means for generating first clock pulses having a selected frequency,

b. a second means for generating second clock pulses having a frequency such that the ratio of said first clock pulse frequency to said second clock pulse frequency is the same as the minimum percent break ratio of the range,

c. a third means for generating third clock pulses having a

frequency such that the ratio of said first clock pulse frequency to said third clock pulse frequency is the same as the maximum percent break ratio of the range,

d. a first means for counting the number of said first clock pulses generated during the dial pulse period,

e. a second means for counting the number of said second clock pulses generated during the break portion of the dial pulse,

f. a third means for counting the number of said third clock pulses generated during the break portion of the dial pulse, and

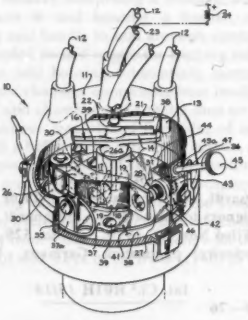
g. comparator means connected to each of said counting means to compare the count of said first clock pulses with the count of said second clock pulses and to compare the count of said first clock pulses with the count of said third clock pulses.

3,997,741

ADJUSTABLE CONTACT POINT ASSEMBLY FOR DISTRIBUTORS

Roger J. Borgen, 2300 - 16th Ave., San Francisco, Calif. 94116

Filed June 2, 1975, Ser. No. 582,832
Int. Cl.² H01H *1/34, 19/62*
U.S. Cl. 200—31 A **6 Claims**



1. In a distributor assembly of a type having a mounting base member, a support member carrying said base member, a moving breaker arm supported by said base member and having an electric contact point thereon, an inverted bowl-shaped cap carrying a plurality of spark plug leads extending into the bowl portion of said cap, a stationary electrical contact point element, a rotor assembly mounted for rotation to be electrically coupled to each of said leads during each revolution of the rotor, and means including a cam coupled to rotate with said rotor for cyclically moving said breaker arm to carry its said contact point between advanced and retracted positions relative to said stationary point to make and break an electrical circuit between said points, the improvement comprising means carried in fixed relation to said base member for supporting said stationary element to be adjusted axially between advanced and retracted positions, means for simultaneously moving and continuously locking said stationary element to respectively adjust and retain the spacing between said point and said element, and means simultaneously retaining said base member secured in fixed immovable relation to said support member.

3,997,742

AUTOMATIC TIMER SWITCH

Edgar E. Marquis, Newtown, Conn., assignor to Robertshaw Controls Company, Richmond, Va.

Filed Mar. 14, 1975, Ser. No. 558,608
Int. Cl.² H01H *43/10, 7/08*
U.S. Cl. 200—38 FB **15 Claims**

1. A timer switch comprising

support means,

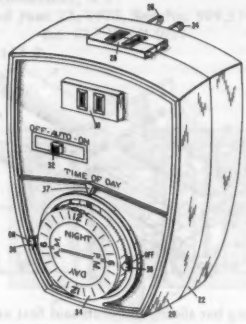
a blade having one end pivoted on the support means with the other end of the blade movable between first and second positions,

an operating member,

said support means having a guideway for receiving and guiding the operating member,

said guideway having one side and first and second ends limiting movement of the operating member along the one side to movement between the first and second ends of the guideway,

a spring connecting the free end of the blade to the operating member such as to bias the blade into the first position when the operating member is at the first end of the guideway and to bias the blade into the second position when the operating member is at the second end of the guideway,



said spring biasing the operating member against the one side of the guideway,

said one side of the guideway having an intermediate point and first and second portions inclined in the direction of the spring bias from the intermediate point to the respective first and second ends of the guideway such that the first and second portions of the one side cam the operating member under the bias of the spring to the respective first and second ends of the guideway,

contact means operated by the blade to open the close at least one circuit, and

timing means for alternately moving the operating member from the first end of the guideway past the intermediate point and from the second end of the guideway past the intermediate point.

3,997,743

PNEUMATICALLY ACTUATED HIGH POWER RF SWITCH

Frederick Richard Hock, Columbia, and William Dall Hopkins, Woodbine, both of Md., assignors to International Telephone and Telegraph Corporation, Nutley, N.J.

Filed May 1, 1975, Ser. No. 573,711
Int. Cl.² H01H *35/38*
U.S. Cl. 200—81 R **15 Claims**

1. A high power radio frequency (RF) switch comprising:

a mounting plate disposed in a first plane;

a first high voltage RF contact supported from one side of said mounting plate and disposed in a second plane spaced from and parallel to said first plane;

a second high voltage RF contact supported from said one side of said mounting plate and disposed in said second plane spaced from said first contact;

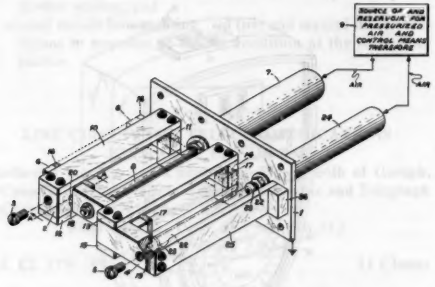
a shorting bar disposed in switching relationship with both said first and second contacts, said shorting bar being disposed between said mounting plate and said first and second contacts; and

a first pneumatic actuating means supported from said

mounting plate and connected to said shorting bar to make and break a connection between said shorting bar and both of said first and second contacts;

said first contact being supported between a first insulated support connected to said mounting plate in a third plane perpendicular to said first and second planes and a second insulated support connected to said mounting plate in a fourth plane parallel to and spaced from said third plane;

said second contact being supported between a third insulated support connected to said mounting plate in said third plane spaced from said first insulated support and a fourth insulated support connected to said mounting plate in said fourth plane spaced from said second insulated support;



said shorting bar sliding between said first and second insulated supports and between said third and fourth insulated supports upon actuation of said shorting bar by said first actuating means;

each of said first and second contacts having a channel formed in a surface thereof facing said mounting plate; and

said shorting bar including

a cylindrical portion adjacent each of said channels,

said cylindrical portion contacting the edges of an associated one of said channels when a connection is made between said shorting bar and both of said first and second contacts.

3,997,744

LIQUID LEVEL DETECTOR

Nobumasa Higo, Toyota, Japan, assignor to Nippondenso Co., Ltd., Kariya and Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, both of, Japan

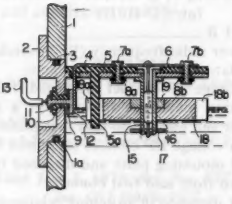
Filed Mar. 21, 1974, Ser. No. 453,533

Claims priority, application Japan, Mar. 31, 1973, 48-39476[U]

Disclosure was also published under second Trial Voluntary Protest Program on Feb. 17, 1976

Int. Cl.² H01H *35/18*

U.S. Cl. 200—84 C **6 Claims**



1. A liquid level detector for detecting the level of a liquid in a container comprising:

a body portion fitted in a mounting opening formed on one side of a container;

a supporting plate attached to and extending from said body inside said container in a horizontal direction;

a reed switch;

a case for housing said reed switch therein, said case being vertically secured to said supporting plate and said reed switch being vertically positioned;

a float formed as a horizontally long and slender shape with a length substantially greater than its width, and guided by said case to slide up and down in accordance with the change of the level of said liquid;

a turning-preventive member engaging said float to prevent turning thereof so that the longitudinal dimension of said float is oriented toward said mounting opening;

a permanent magnet mounted on the inside of said float to open and close said reed switch in accordance with the change of the level of said liquid;

a stopper for sealing said float in said case;

an electric connecting plate connected to said reed switch, and

an insulating board for electrically insulating said electric connecting plate from said supporting plate, said insulating board formed integral with said turning-preventive member.

3,997,745

SWITCHES

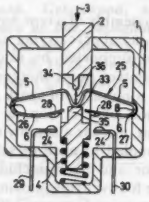
Erich Marquardt, and Werner Storz, both of Rietheim, Germany, assignors to Firma J & J Marquardt, Germany

Filed Nov. 29, 1974, Ser. No. 528,398

Claims priority, application Germany, Dec. 3, 1973, 2360168

Int. Cl.² H01H *15/18*

U.S. Cl. 200—76 **5 Claims**



1. In an electric switch comprising:

a. a housing,

b. at least one fixed contact mounted in the housing,

c. a movable contact located for engagement with at least one fixed contact,

d. a contact arm carrying said movable contact being movable between open and closed positions with a snap over action,

e. a snap spring controlling the movement of said contact arm, the spring and contact arm being of a one piece construction which together define a U-shaped catch element pivotally mounted in said housing on the web of the U-shaped catch element, and

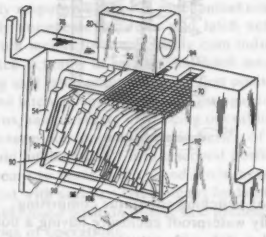
f. said spring being stressed at least in a dead centre position between its ends, the improvement being in that two U-shaped elements are provided as a one piece construction defining a single common snap spring which is provided with an arcuate portion in the middle thereof, the apex of the arcuate curved portion facing towards the free ends of the contact arms.

3,997,746

CIRCUIT BREAKER WITH ARC CHAMBER SCREEN

George S. Harper, and Lyal N. Merriken, both of Cambridge, Md., assignors to Airpax Electronics, Incorporated, Cambridge, Md.

Continuation-in-part of Ser. No. 463,269, April 23, 1974, abandoned. This application Mar. 28, 1975, Ser. No. 562,919
Int. Cl.² H01H 9/30, 33/00
U.S. Cl. 200—144 R 25 Claims



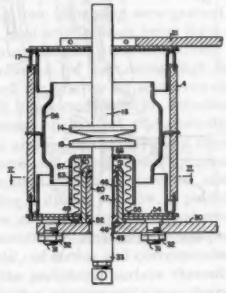
1. A circuit breaker comprising a housing, stationary and movable contacts in said housing, a handle, a collapsible toggle coupling said handle to said movable contact, overcurrent means coupled to said toggle for tripping said toggle, an arc chamber in said housing substantially surrounding said contacts, said arc chamber comprising heat insulating baffles on five sides of said chamber and a metal shoe on a remaining side of said chamber, one of said five sides of said chamber comprising both a baffle and a wire mesh screen, said housing having an arc gas vent adjacent said contacts for venting arc gases from the area of said contacts to atmosphere, said wire mesh screen being made of temperature and corrosion-resistant material and overlying said vent, said screen having a wire diameter size of from 0.028 to 0.032 inch, with the center-to-center spacing of said wires being from 1/14th to 1/18th of an inch.

3,997,747

CIRCUIT INTERRUPTER

Paul O. King, deceased, late of Turtle Creek, Pa., and by Westinghouse Electric Corporation, Pittsburgh, Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Nov. 20, 1972, Ser. No. 308,092
Int. Cl.² H01H 33/66
U.S. Cl. 200—144 B 14 Claims



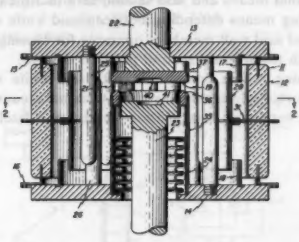
1. A circuit interrupter comprising a tubular electrical conductor, a second electrical conductor disposed within the tubular conductor, at least one of the conductors being movable relative to the other conductor, an electrically conducting sleeve disposed around said second conductor and within said tubular conductor to carry current from one to the other of said conductors, said electrically conducting sleeve having a portion in electrical contact with said second conductor and having another portion extending radially outwardly in electrical contact with said tubular conductor, and resilient means comprising a body of flexible material between one of said conductors and the sleeve for maintaining the sleeve in a biased position of contact against the tubular conductor and against the second conductor.

3,997,748

VACUUM INTERRUPTER WITH PRIMARY ELECTRODE SURROUNDED BY HIGH DIELECTRIC STRENGTH SHIELD

Lawson P. Harris, Scotia, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed June 23, 1975, Ser. No. 589,516
Int. Cl.² H01H 9/34
U.S. Cl. 200—144 B 10 Claims



1. A vacuum arc device adapted to interrupt high currents at high voltages comprising:

an evacuated envelope having a pair of opposed, conductive endwalls and an insulating sidewall;

a first plurality of spaced cylindrical rod electrodes extending inwardly from a first of said endwalls;

a secondary plurality of spaced cylindrical rod electrodes extending inwardly from the second of said endwalls and eing interdigitated with said first plurality to form a single, annular array of spaced rod electrodes;

a central pair of primary arc electrodes, each of said primary arc electrodes having a contact abutting the other contact when carrying normal load current, one of said primary arc electrodes being electrically connected to the first of said endwalls and the other of said primary arc electrodes being electrically connected to the second of said endwalls; and

a high dielectric strength shield situated between the annular array of rod electrodes and said one of said primary arc electrodes, said shield being electrically isolated from both of said endwalls;

said one of said primary arc electrodes being retractable into said shield so as to separate its contact from the contact of the other of said primary arc electrodes upon occurrence of an overload condition requiring excessive load current.

3,997,749

ELECTRIC VEHICLE EMERGENCY POWER DISCONNECT SWITCH

Michael W. Hanagan, Somers, Conn., assignor to Corbin Gentry Inc., Somersville, Conn.

Filed Feb. 13, 1975, Ser. No. 549,839
Int. Cl.² H01H 1/42
U.S. Cl. 200—162 9 Claims

1. A disconnect means employable in an electrical circuit for purposes of permitting an interruption of the electrical circuit to be effected through the operation thereof comprising:

a. enclosure means including a multiplicity of joined wall members operable as a housing for some of the operating components of the disconnect means:

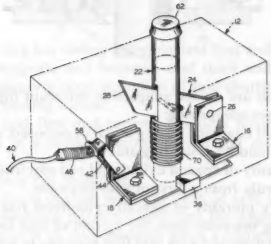
b. first terminal means supported in said enclosure means, said first terminal means being adapted for connection in circuit relation with the electrical circuit;

c. second terminal means supported in said enclosure means in spaced relation to said first terminal means, said second terminal means being adapted for connection in circuit relation with the electrical circuit;

d. a knife switch supported on said first terminal means in electrical circuit relation therewith for movement relative to said second terminal means between a first position wherein said knife switch engages said second terminal means to complete an electrical circuit between said first terminal means and said second terminal means and a second position wherein said knife switch is spaced from said second terminal means thereby causing an open circuit condition to be established between said first terminal means and said second terminal means;

e. biasing means extending between said knife switch and one of said wall members operable for biasing said knife switch toward said second position thereof;

f. latching means cooperable with said knife switch and supported adjacent said second terminal means for movement between a first position wherein said latching means



engages said knife switch when said knife switch is in the first position thereof to latch said knife switch in a closed circuit condition and a second position wherein said latching means is disengaged from said knife switch thereby freeing said knife switch for movement between said first position and said second position thereof in response to the force exerted by said biasing means;

g. actuator means operatively connected to said latching means extending outwardly of said enclosure means and manually operable for moving said latching means between said first position and said second position thereof, said actuator means comprising a pull cord operatively connected at one end to said latching means and having grasping means at the other end thereof, said grasping means being located externally of said enclosure means and

h. reset means operatively connected to said knife switch comprising a plunger extending through one of said wall members of said enclosure means to provide an exposed portion adapted for effecting manual manipulation of said plunger, said plunger being mounted for reciprocating movement whereby movement of said knife switch from said first to said second positions thereof effects movement of said plunger in one direction and movement of said plunger in the opposite direction effects movement of said knife switch from said second to said first positions thereof.

3,997,750

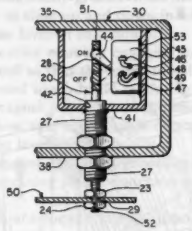
WATERPROOF SWITCH

Ira M. Glazer, 4930 Jackson St., Hollywood, Fla. 33021

Filed Apr. 9, 1975, Ser. No. 566,388

Int. Cl.² H01H *9/04*

U.S. Cl. 200—302 **6 Claims**



1. Waterproof switching apparatus comprising:

a substantially waterproof enclosure having a bottom wall;

an electrical switch with actuator means, said switch secured inside said enclosure above said bottom wall, adapted to be alternately actuated between a first and a second position;

a first member, communicating with said actuator means and extending upwardly through said bottom wall, movable to alternately actuate said switch between said first and said second positions; and

a second member, linked to said first member below said bottom wall and extending upwardly above said bottom wall, operable to move said first member for actuating said switch.

3,997,751

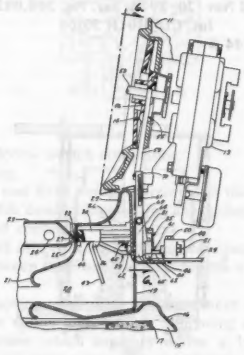
ACCESS DOOR LATCH MECHANISM

William J. McNally, Newton, Iowa, assignor to The Maytag Company, Newton, Iowa

Filed Feb. 24, 1975, Ser. No. 552,190

Int. Cl.² D06F *33/02, 37/28;* **H01H** *35/00, 3/20*

U.S. Cl. 200—61.62 **11 Claims**



1. A selectively operable access door latch mechanism for an apparatus including a plurality of electrically energizable components operable through a series of operations under control of sequential control means having rotatable cam means and a plurality of cam-operated switches for controlling energization of said components and wherein said apparatus

includes cabinet means and an access door on said cabinet means operable between a closed position and an open position, the combination comprising: first latch means on said access door; normally disengaged second latch means mounted on said cabinet means for movement relative to said cabinet means into engagement with said first latch means for latching said access door in said closed position; actuator means including an auxiliary cam associated with and rotatable with the cam means of said sequential control means and further including a pivotally mounted latch actuator on said cabinet means for engagement with said auxiliary cam and operatively responsive thereto; mechanical connecting means operatively connected between said latch actuator and said second latch means for transmitting cam-induced movement of said latch actuator to said second latch means; and means for biasing said latch actuator into a first position to maintain said second latch means operatively disengaged from said first latch means, said auxiliary cam being operable during at least one predetermined portion of said series of operations for moving said latch actuator into a second position against said biasing means to move said second latch means into latching engagement with said first latch means for latching said access door in said closed position during said predetermined portion of the series of operations.

3,997,752

COOKING TIME INDICATION ARRANGEMENT FOR USE IN MICROWAVE OVEN

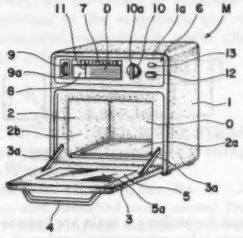
Chikao Nakano, Yamato Koriyama, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Sept. 22, 1975, Ser. No. 615,706

Claims priority, application Japan, Oct. 4, 1974, 49-120613[U]; Oct. 8, 1974, 49-121986[U]; Sept. 26, 1974, 49-116703[U]

Int. Cl.² H05B 9/06

U.S. Cl. 219—10.55 R **16 Claims**



1. A cooking time indication arrangement for use in a microwave oven, said arrangement being for a microwave oven including an oven-defining structure having an access opening, means provided for generating high frequency energy directed toward the interior of said oven-defining structure and a hingedly supported door for selectively opening and closing the access opening of said oven-defining structure, said indication arrangement comprising timer means for setting cooking time and display means for visually representing various information relating to menus, said display means further including a display window, a pointer needle in said display window and associated with said timer means, and a rotary drum member associated with said pointer needle and having a plurality of menus and corresponding cooking times indicated on the peripheral surface thereof for observation through said display window said rotary drum member having a tubular member and a disc member fitted into opposite ends thereof, said tubular members having an axial hollow projection and said disc member having an axial projection integrally connected thereto, said axial hollow projection and said axial projection being in alignment with longitudinal axis of said rotary hollow drum member, and a frame having bearings thereon receiving said projections for rotation of said drum member, a rotating wheel coupled to said tubular member and being rotatable from outside of the microwave oven for rotating said rotary drum member for registering one particular menu in said plurality of menus, and illuminating means in said drum member for illuminating said peripheral surface of said drum member.

3,997,753

CONTROL SYSTEM AND METHOD FOR ELECTRIC DISCHARGE MACHINING (EDM) USING A PREDETERMINED PORTION OF EACH DISCHARGE PULSE FOR MONITORING

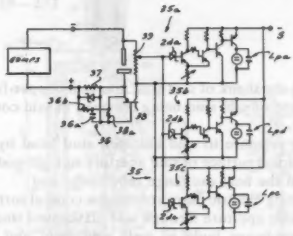
Kiyoshi Inoue, 3-chome 16-8, Kamiyoga, Setagaya, Tokyo, Japan

Continuation-in-part of Ser. No. 272,463, July 17, 1972, Pat. No. 3,781,507, which is a division of Ser. No. 19,364, March 13, 1970, Pat. No. 3,686,461. This application Oct. 19, 1973, Ser. No. 407,961

Claims priority, application Japan, Mar. 17, 1969, 44-20518; Apr. 8, 1969, 44-27070

Int. Cl.² B23P 1/08

U.S. Cl. 219—69 C **5 Claims**



1. A method of detecting electrical discharges of a particular class for controlling a parameter in the operation of an electrical discharge machining apparatus in which a series of electric pulses are applied across a dielectric-filled machining gap between a tool electrode and a workpiece juxtaposed therewith, the pulses resulting in electrical discharges of different characteristic classes, the method comprising the steps of:

measuring a gap variable over a selected time period within each electrical discharge to produce a signal specific to the individual discharge representing the measured value, and comparing the measured value with a reference value by applying said signal to a circuit having a threshold level corresponding to said reference value and defining a range of a measured value corresponding to electrical discharges of said particular class to produce an output representing the latter, said selected portion of said discharge being subsequent to initiation thereof.

3,997,754

PROCESS FOR THE MANUFACTURE OF A HEAT EXCHANGE TUBE WITH SURFACES PROVIDED OF RADIAL WELDED STUDS

José Gasulla Moliner, Bilbao y, and Amador Royo Rivas, Portugalete (Bilbao), both of Spain, assignors to "OGIPSA" Oleoductos, Gaseoductos e Instalaciones Petroliferas, S.A., Bilbao, Spain

Filed Apr. 9, 1974, Ser. No. 412,791

Int. Cl.² B23K 9/20

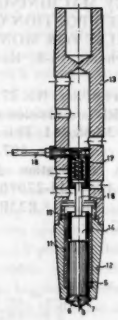
U.S. Cl. 219—99 **5 Claims**

1. A method of manufacturing a heat exchange tube including a body and a plurality of studs extending radially outwardly from the surface of said body, comprising the steps of:

providing a stud having an elongate shank and an enlarged head at one end thereof;

providing a welding head including an electrode having a bore substantially larger than the stud shank and terminating in a conical aperture which receives said enlarged head;

providing a copper-free sheath within said bore and disposed inwardly of said aperture so as to be displaced from the enlarged head of a stud seated in said welding head, said sheath being of a material having a substantially higher electrical resistance than the material of said electrode;



inserting the shank of said stud into said copper-free sheath, the head of said stud being received in said conical aperture;

applying pressure to said enlarged stud head by means of the conical surface of said aperture to urge said stud head against the heat exchange tube body; and

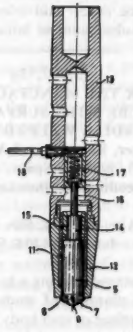
transmitting electric current from the conical surface of said electrode aperture through said juxtaposed stud head and heat exchange body to weld said head and said body together, said conical aperture defining a cavity for retaining and shaping said stud head during the welding process.

3,997,755

ELECTRODE SPECIALLY FOR WELDING STUDS IN HEAT EXCHANGER TUBES

José Gasulla Moliner, Bilbao, and Amador Royo Rivas, Portugalete (Bilbao), both of Spain, assignors to "OGIPSA" Oleoductos, Gaseoductos e Instalaciones Petroliferas, S.A., Bilboa, Spain

Filed Apr. 9, 1974, Ser. No. 412,788
Int. Cl.² B23K *11/30*
U.S. Cl. 219—120 **3 Claims**



1. An improved electrode for welding studs having enlarged heads thereon to the surface of a heat exchager tube, comprising:

a welding head formed of a metal exhibiting a high electrical conductivity, said welding head having a bore formed therewithin, said bore opening in a conical orifice formed to accept the enlarged head of a stud and having a first, smaller diameter adjacent said orifice and a second, larger diameter distant from said orifice;

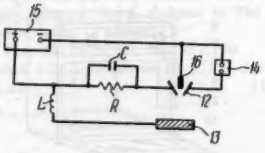
a hollow cylindrical sheath for guiding the stud, said sheath seating in said larger diameter of said bore and being formed of a conductive metal which is substantially less conductive than said welding head.

3,997,756

METHOD FOR STRIKING MAIN ARC BETWEEN THE ELECTRODE OF PLASMATRON AND WORKPIECE, AND CONTRIVANCE EMBODYING SAME

David Grigorievich Bykhovsky, Konjushenny pereulok, 1/6, kv. 18; Alexandr Yakovlevich Medvedev, ulitsa Kalyaeva, 3, kv. 17; Alexandr Yakovlevich Finkelshtein, ulitsa Belgradskaya, 24, kv. 13; Jury Alexandrovich Bogorodsky, prospekt Mechnikova, 14, kv. 163, and Mikhail Isaakovich Zax, ulitsa Shkolnaya, 3, kv. 4, all of Leningrad, U.S.S.R.

Filed June 21, 1974, Ser. No. 481,821
Int. Cl.² B23K *5/00*
U.S. Cl. 219—121 P **8 Claims**



1. In a method for striking a main arc between a workpiece and an electrode of a plasmatron equipped with a nozzle, which is spaced from said electrode, including the steps of connecting the electrode of the plasmatron and the workpiece to opposing terminals of a power source; feeding a chemically-active plasma-forming gas into the space between the nozzle and the electrode; electrically connecting the space between the electrode and the nozzle of the plasmatron with an oscillator high-frequency discharge; closing the space between the electrode and the workpiece by a pilot arc flame formed with the aid of said plasmaforming gas which is fed into the plasmatron to form the main arc circuit; and disconnecting the pilot arc circuit; the improvement which comprises: maintaining the pilot arc current intermittently throughout the arcing of the pilot arc, the amplitude of said pilot arc current being maintained within the range

$$i = 0.8I - 3I$$

where

i = amplitude of pilot arc current and

I = steady current of main arc;

and maintaining the frequency and on-off time ratio of the current of the pilot arc so as to ensure visually-controlled continuous flame throughout the arcing of the pilot arc.

3,997,757

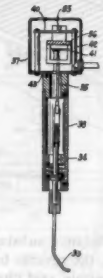
PROPORTIONAL CONTROL FOR GUIDANCE SYSTEMS, AND THE LIKE

Shelby Cecil, Medina, and Dean D. Riggs, Avon Lake, both of Ohio, assignors to The Cecil Equipment Company, Medina, Ohio

Continuation-in-part of Ser. No. 307,203, Nov. 16, 1972, Pat. No. 3,857,080. This application Aug. 19, 1974, Ser. No. 498,611

Int. Cl.² B23K 9/12

U.S. Cl. 219—124 8 Claims



1. A probe or master for guiding a slave or associated apparatus along a path, said probe comprising a housing, a shaft extending longitudinally in said housing, a sensing tip carried on said shaft and adapted to engage said path and to detect vertical and horizontal changes and deviations therein, pivot means supporting said shaft, intermediate its length for pivoting about two axes at right angles to each other, and means supported by said housing and shaft, and having relative motion between portions thereof supported on said housing and shaft, respectively, for providing an electrical characteristic output in proportion to the magnitude and direction, both vertical and horizontal, respectively, of the change or deviation in said path detected by said sensing tip.

3,997,758

MOISTURE CONTROL DEVICE FOR STEAM TURBINES

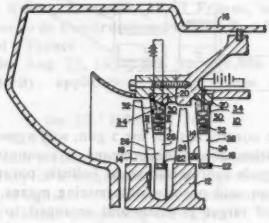
Neville K. Patel, Secane, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Mar. 14, 1974, Ser. No. 451,248

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 2, 1976

Int. Cl.² H05B 1/00; F01D 5/08; F04D 29/58

U.S. Cl. 219—201 6 Claims



1. An axial flow, elastic fluid turbine apparatus comprising:

a rotor;

an annular array of circumferentially spaced rotatable blades fastened to said rotor for rotation therewith;

a casing encircling said annular array of rotatable blades and said rotor;

an annular array of circumferentially spaced stationary nozzle blades fastened to said casing, said annular array of stationary nozzle blades adapted to direct elastic fluid against said array of rotatable blades;

an outer covering disposed over a predetermined portion of at least one of said stationary nozzle blades;

a thermal insulating member disposed between said one of said stationary nozzle blades and said outer covering; and

electrical means for raising the temperature of said outer covering to the Leidenfrost point to prevent the deposition of moisture droplets entrained within an elastic fluid flow on said outer covering to inhibit the agglomeration thereof into larger moisture drops to prevent erosion of said rotatable blades within said annular array of rotatable blades.

3,997,759

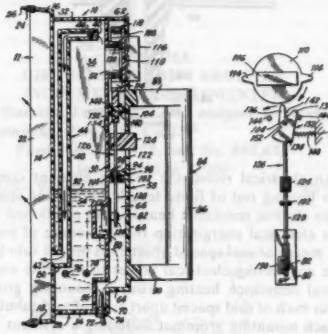
PORTABLE HAND-MANIPULATABLE STEAMER FOR LOOSENING THE BOND BETWEEN WALLPAPER AND A SUBSTRATE

Leonard Osrow, Great Neck, and Jacques L. LeBaigue, Greenlawn, both of N.Y., assignors to Osrow Products Co., Inc., Glen Cove, N.Y.

Filed Nov. 18, 1974, Ser. No. 524,716

Int. Cl.² H05B 3/60; F22B 1/30; A47L 13/00

U.S. Cl. 219—272 14 Claims



1. A portable hand manipulatable steamer for applying steam to a vertical surface, said steamer comprising:

A. a steam plenum chamber having

I. front, side and rear walls, a top and a bottom,

II. means providing an open steam discharge mouth in a wall of the plenum chamber and being disposed in a vertical plane when the steamer is used,

B. a water chamber mounted on the plenum chamber and

I. having front, side and rear walls, a top and a bottom,

II. a wall other than the rear wall of the water chamber and a wall other than the front wall of the steam plenum chamber being a common wall to both said chambers,

III. said water chamber having means providing a fill-opening therein,

C. a cap for selectively closing said fill-opening,

D. means associated with said common wall providing a steam passageway entirely disposed on the water chamber side of said common wall,

I. said steam passageway having a steam entry port within the water chamber and

II. having a steam discharge port in the common wall facing the steam plenum chamber and located immediately adjacent the bottom of the steam plenum chamber,

III. said common wall being flat and uninterrupted except by said steam discharge port,

IV. said steam entry port being immediately adjacent the top of said common wall,

E. a pair of spaced electrodes in and near the bottom of the water chamber,

F. means for supplying electric power to said electrodes,

I. whereby when said electrodes are energized they will generate heat electrolytically by passage of electric current therebetween and through water in the water chamber,

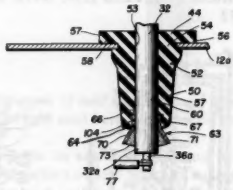
G. switch means interposed between the electrodes and the means for supplying electric power to control energization of the electrodes from the means for supplying electric power, and

H. said steamer further including a handle for moving the steamer out on a wallpapered vertical surface.

3,997,760
ELECTRIC HEATING ELEMENT WITH BULKHEAD MOUNTING MEANS

Fred G. Salinger, Baltimore, Md., assignor to Electro-Therm, Inc., Laurel, Md.

Filed Dec. 6, 1974, Ser. No. 530,321
Int. Cl.² F24H *1/00;* **H05B** *1/00*
U.S. Cl. 219—336 **7 Claims**



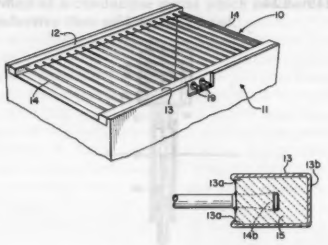
1. An electrical resistance heating element comprising a tubular heating rod of finite length and having spaced apart ends, an electric resistance heating wire positioned within the rod for electrical energization from a source of power, connector means at said spaced apart ends of said tubular heating rod for connecting electrical power to opposite ends of said electrical resistance heating wire, a mounting grommet secured to each of said spaced apart ends of said tubular heating rod, each mounting grommet including a resilient body portion of a size to be forcibly urged through an aperture formed in a bulkhead of predetermined thickness, a neck portion formed integral with said resilient body portion and having an axial extent to receive said bulkhead of predetermined thickness, said neck portion being of a size substantially to fill the aperture formed in said bulkhead, a head portion formed integral with said neck portion to overlie the periphery of the aperture within said bulkhead on the side opposite of said resilient body portion, a passage formed axially through said resilient body portion, said neck portion and said head portion to receive the respective spaced apart end of said tubular heating rod, and seal means including a rigid annular member having a first portion inserted into said passage and a second portion extending axially of said body portion to form an annular trough about said tubular heating rod for receiving sealing adhesive therein to provide a fluid-tight seal between said grommet and said respective end of said heating rod.

3,997,761
SELF-CLEANING FOOD SUPPORTING GRILL

Willard Gebien, Mundelein, Ill., assignor to Bel-Air Tool, Die & Engineering Company, Chicago, Ill.

Filed Feb. 10, 1976, Ser. No. 656,789
Int. Cl.² H05B *3/68*
U.S. Cl. 219—463 **6 Claims**

1. A self-cleaning food supporting grill construction comprising, a steel tubing bent into a serpentine shape of a plurality of substantially spaced apart and parallel straight sections interconnected by reverse bend end sections, male electrical plug terminals electrically connected to the ends of said tubing for the connection of a source of certain electrical power directly to said tubing, said tubing having an electrical resistance related to said source of certain electrical power to resistance heat to a temperature sufficient to burn any food residues from the surface of said tubing upon the connection of said source of certain electrical power to said male plug terminals, a metal channel member substantially U-shaped in transverse cross-section, the legs of said channel member

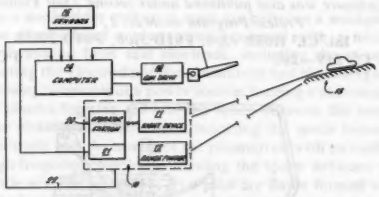


being spaced apart a distance substantially greater than the diameter of said tubing, the reverse bend end sections of said tubing being disposed within said channel members substantially midway between the legs thereof, and a thermally-conductive electrically-insulative ceramic-like cement molded in place within said channel member and about said reverse bend end sections of said tubing to rigidly support said tubing in said serpentine shape within said channel member and electrically insulated from and in thermal conductive contact with said channel member.

3,997,762
FIRE CONTROL SYSTEM

David Scarth Ritchie; James Gordon Hamilton, both of Caxton St., Anniesland, Glasgow, G13 1HZ, Scotland, and Alexander James Martin, Procurement Executive, Ministry of Defence, London S.W.1., England

Filed Oct. 6, 1975, Ser. No. 620,200
Claims priority, application United Kingdom, Oct. 9, 1974, 43668/74; Nov. 16, 1974, 49816/74
Int. Cl.² G06F *15/58*
U.S. Cl. 235—61.5 R **8 Claims**



1. A fire control system for a gun, said system comprising target position determining means, a computer adapted to receive signals representative of ballistic parameters and to receive from said position-determining means signals representative of target position and arranged to compute fire control signals therefrom, and a gun drive mechanism coupled to receive said fire control signals, and wherein said target position determining means includes a sighting device having a visual display on which first, second and third images are presented in super-imposition, said first image being formed from radiation in the visible spectrum emanating from a field of view, said second image being defined by a target aiming mark, and said third image being formed from radiation in the

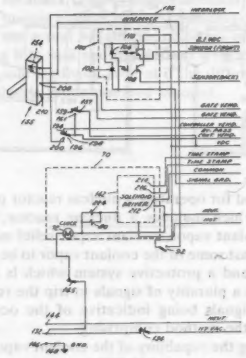
infrared spectrum emanating from said field of view, said target position determining means including a manually-controllable element for altering said field of view.

3,997,763

TICKET READER AND IMPRINTER WITH BYPASS SWITCH

Donald S. Schasser, Pinckney, Mich., assignor to Automatic Parking Devices, Inc., Farmington, Mich.

Filed Apr. 24, 1975, Ser. No. 571,267
Int. Cl.² G06K 7/14
U.S. Cl. 235—61.9 R 3 Claims



1. A ticket reader and imprinter for use with a ticket having at least one hole prepunched therein comprising a ticket throat having an entrance to receive said ticket, means positioned adjacent said throat to transfer information onto a ticket disposed in said throat upon receipt of a transfer signal, means to sense insertion of a ticket through said entrance and into said throat in a predetemined orientation, means responsive to said sensing means to supply a transfer signal, and switch means selectively responsive to insertion of a ticket into said throat to supply a transfer signal independently of orientation of the ticket in said throat.

3,997,764

METHOD FOR THE CONVERSION OF A FREQUENCY INTO A NUMBER

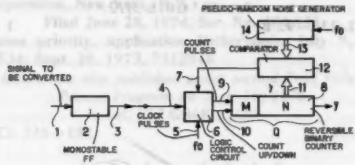
Jean-Claude Belmonte, Echirolles; Jean-Jacques Hirsch, Claix, and Pierre Rassat, Grenoble, all of France, assignors to Societe Generale de Constructions Electriques et Mecaniques (ALSTHOM), France

Filed Aug. 23, 1974, Ser. No. 499,906
Claims priority, application France, Aug. 23, 1973, 73.30558
Int. Cl.² H03K 21/10
U.S. Cl. 235—92 FQ 12 Claims

1. A conversion method for obtaining a number representing the frequency of a frequential input signal wherein said frequential input signal is in the form of a series of pulses, each having a pulse width *a* comprising the steps of:

generating at least a first stochastic signal; and

controlling at least a first counting operation in response to the frequential input signal and said first stochastic signal such that clock pulses, generated by a clock pulse generator, which are counted by said first counting operation are counted up during the time period *a* when said frequential input signals are present and counted down at all other times, whereby the number resulting from the first counting operation is utilized for generating the first stochastic signal and wherein said first stochastic signal is



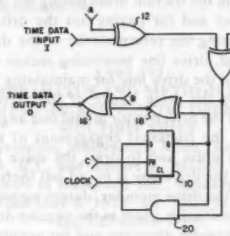
a coding in a stochastic representation form of the number representing the frequency of said frequential input.

3,997,765

CIRCULATING SHIFT REGISTER INCREMENTER/DECREMENTER

Vijay V. Marathe, Loveland, Colo., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Filed July 14, 1975, Ser. No. 595,655
Int. Cl.² H03K 27/00
U.S. Cl. 235—92 SH 15 Claims



1. A circuit for incrementing and decrementing coded digits of digital data in response to a clock signal and timed control signals, each digit having a plurality of bits and stored in a circulating shift register memory, said circuit comprising:

input gating means coupled to the circulating shift register memory for producing a first output signal in response to the data and first and second control signals;

clocked switching means coupled to the input gating means for producing a second output signal in response to the first output signal, the clock signal and a third control signal, said clock signal being at approximately the same rate as the rate at which data is received by the input gating means; and

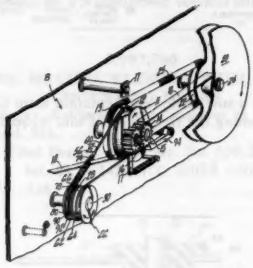
output gating means coupled to the the input gating means and the clocked switching means for producing coded bits of digital data incremented with respect to the data received by the input gating means, in response to the first and second output signals and the second control signal, said incremented data being produced when the first and second control signals are logic zero for all bits of the digit, and the third control signal is logic one during the first bit of the digit.

3,997,766

ROTARY INDEXING MECHANISM

Howard J. Voegelin, Cheshire, Conn., assignor to Veeder Industries, Inc., Hartford, Conn.

Filed Sept. 26, 1974, Ser. No. 509,331
Int. Cl.[2] G01L 5/12
U.S. Cl. 235—92 B 1 Claim



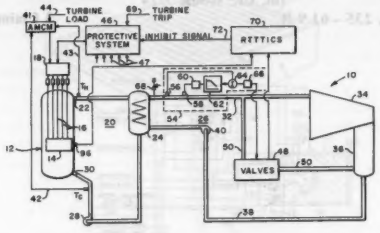
1. A rotary indexing mechanism comprising a driven rotor with an integral coaxial external friction drum, a reciprocably mounted drive member reciprocable back and fourth through drive and return strokes thereof, a drive line wrapped about the friction drum for frictional engagement therewith and having a first end connected to the drive member for drawing the drive line from the friction drum during the drive stroke of the drive member and for paying out the drive line to the friction drum during the return stroke of the drive member, and a second end, drive line tensioning means connected to the second end of the drive line for maintaining the drive line in tension during the drive stroke of the drive member to effect rotation of the driven rotor in said one angular direction thereof through the frictional engagement of the drive line with the friction drum and to draw the drive line from the friction drum as the drive line is payed out thereto during the return stroke of the drive member, detent means for preventing rotation of the friction drum in the angular direction opposite to said one angular direction and for angularly detenting the friction drum in equiangularly spaced positions having a fixed angular increment therebetween, and drive member operating means selectively operable for actuating the drive member through a predetermined drive stroke for effecting rotation of the driven rotor in said one angular direction approximately said predetermined fixed angular increment, the drive member operating means comprising a rotatable drive ratchet shaft and selectively operable means for connecting the drive ratchet shaft for actuating the drive member through its drive stroke for effecting rotation of the driven rotor in said one angular direction, the drive member being angularly reciprocable and comprising a drive pulley, the drive line being wrapped about the drive pulley to draw the drive line from the friction drum and pay the drive line to the friction drum during angular drive and return strokes thereof respectively, and the selectively operable means comprising a lever connected for angularly reciprocating the drive pulley, a ratchet pawl pivoted on the lever and selectively engageable with the drive ratchet shaft for being actuated thereby for pivoting the lever and driving the drive pulley through its drive stroke, and means for selectively engaging the ratchet pawl with the drive ratchet shaft.

3,997,767

REACTOR TRIP ON TURBINE TRIP INHIBIT CONTROL SYSTEM FOR NUCLEAR POWER GENERATING SYSTEM

Jose Marcelo Torres, Simsbury, and Charles Ronald Musick, Vernon, both of Conn., assignors to Combustion Engineering, Inc., Windsor, Conn.

Division of Ser. No. 384,330, July 31, 1973. This application Apr. 9, 1975, Ser. No. 566,557
Int. Cl.[2] G06G 7/54; G21C 7/36; G21D 3/10
U.S. Cl. 235—151 3 Claims



1. A method for operating a nuclear reactor power generating system which includes a nuclear reactor, a turbine for receiving coolant vapor, coolant vapor relief means operable to cause at least some of the coolant vapor to be diverted from the turbine, and a protective system which is independently responsive to a plurality of signals to trip the reactor, at least one of the signals being indicative of the occurrence of a turbine trip, the method comprising:

determining the capability of the coolant vapor relief means to divert coolant vapor;

measuring the reactor power;

comparing the capability of the coolant vapor relief means and the reactor power; and

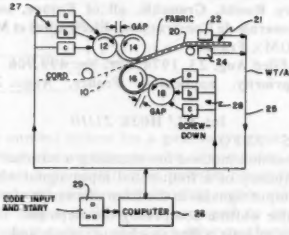
generating an inhibit signal to inhibit the protective system from responding to a turbine trip signal only when the capability of the coolant vapor relief means is greater than the reactor power.

3,997,768

METHOD FOR PRODUCING SHEET MATERIAL OF A DESIRED WEIGHT PER UNIT AREA

Pio V. de Feo, Saratoga, Calif., assignor to Measurex Corporation, Cupertino, Calif.

Filed Oct. 29, 1975, Ser. No. 626,649
Int. Cl.[2] G05B 11/06
U.S. Cl. 235—151.1 1 Claim



1. In a method for producing a sheet material of a desired weight per unit area and for changing from said one desired weight per unit area to another where such material is formed by a calender having rollers and including means for adjusting the gap between rollers to vary the weight per unit area of such material, and including a gauge for sensing the actual

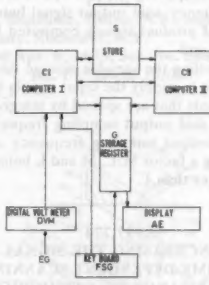
weight per unit area of said material and including a feedback control loop driving said gap adjusting means for causing said actual weight per unit area to move toward said desired weight per unit area, and computer means including memory means for storing nominal gap distances respectively for a plurality of different desired weights per unit area of said sheet material, said method comprising the following steps: running at said one desired weight per unit area and allowing said feedback control loop to adjust said gap to move said actual weight per unit area toward said one desired weight per unit area; determining the nominal gap at said one desired weight per unit area, entering said another desired weight per unit area in said computer means; finding the difference between the nominal gap, stored in said memory means, associated with said another desired weight per unit area and said one nominal gap; disabling said feedback control loop; thereafter actuating said gap adjusting means a distance corresponding to said difference; sensing the actual weight per unit area of said material and comparing it to said another desired weight per unit area and resuming said feedback control if the difference therebetween is less than a predetermined amount.

3,997,769

DIGITAL DECADIC INDICATOR DEVICE FOR MEASURED VALUES

Gunter Hansmann, Herzberger Landstrasse 81, 3400 Gottingen, Germany

Filed Dec. 5, 1974, Ser. No. 529,967
Int. Cl.² G06G 7/48; G01G 19/40, 19/04, 3/14
U.S. Cl. 235—151.13 **7 Claims**



1. A digital, decimal measuring and readout device to indicate measured values, obtained in a measuring apparatus which performs a series of repeated measurements and provides a set of respective, measured output signals (eg), comprising

means (S) storing the individual output signals of the set of signals;

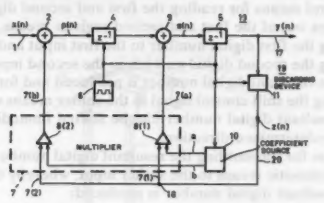
and first computing means (C I;9) operating on the individual output signals of the set stored in the storing means to calculate the associated, accidental or Gaussian measurement error forming the Gaussian standard deviation, from the mean, associated with each measurement value as represented by the respective individual output signals of said set of output signals.

3,997,770

RECURSIVE DIGITAL FILTER

Theodoor Antonius Carel Maria Claasen; Wolfgang Friedrich Georg Mecklenbrauker, and Johannes Bernhard Heinrich Peek, all of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed June 28, 1974, Ser. No. 484,121
Claims priority, application Netherlands, July 9, 1973, 7309534; Sept. 20, 1973, 7312946
Disclosure was also published under second Trial Voluntary Protest Program on Mar. 16, 1976
Int. Cl.² G06F 15/20
U.S. Cl. 235—152 **11 Claims**



1. A digital filter comprising

input means for receiving input digital signals to be filtered;

arithmetic means, having a first input connected to said input means, a second input, and an output, for performing a predetermined arithmetic operation on said input digital signals;

delay means, having an input connected to said output of said arithmetic means, and an output for producing a predetermined delay; and

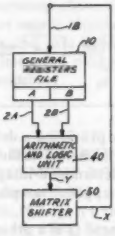
feedback means, connected to said output of said delay means for providing a feedback signal which is applied to said second input of said arithmetic means, comprising discarding means for discarding a predetermined number of less significant bits.

3,997,771

APPARATUS AND METHOD FOR PERFORMING AN ARITHMETIC OPERATION AND MULTIBIT SHIFT

Andrew A. Perlowski, Minnetonka, Minn.; Robert H. Wallace, Portsmouth, R.I., and Robert L. Magers, New Concorde, Ohio, assignors to Honeywell Inc., Minneapolis, Minn.

Filed May 5, 1975, Ser. No. 574,325
Int. Cl.² G06F 7/38
U.S. Cl. 235—156 **8 Claims**



1. Digital apparatus for performing an arithmetic operation on a first digital number and a second digital number to obtain a resultant digital number and for shifting the bits of the resultant digital number before the resultant digital number is stored, said apparatus comprising:

first register means for storing the first digital number;

second register means for storing the second digital number;

arithmetic means for performing an arithmetic operaion on the first digital number and the second digital number to form the resultant digital number, said arithmetic means comprising a first input for receiving the first digital number from the first register means and a second input for receiving the second digital number from the second register means;

shifter means including a shifter input and a shifter output for performing a multibit shift in a predetermined direction on the resultant digital number during a single transmission of the resultant digital number from the shifter input to the shifter output in response to a shift control signal;

control means for reading the first and second digital numbers out of the first and second register means, conducting the first digital number to the first input and conducting the second digital number to the second input, so that the resultant digital number is produced and for transmitting the shift control signal to the shifter means so that the resultant digital number can be shifted immediately in a predetermined direction;

means for transmitting the resultant digital number from the arithmetic means to the shifter input, whereby the shifted resultant digital number is produced;

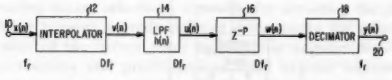
a storage register; and

means for storing the shifter resultant digital number in the storage register.

3,997,772
DIGITAL PHASE SHIFTER

Ronald Eldon Crochiere, Chatham; Lawrence Richard Rabiner, Berkeley Heights, and Richard Robert Shively, Convent Station, all of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Sept. 5, 1975, Ser. No. 610,540
Int. Cl.² G06F *1/00*
U.S. Cl. 235—152 **11 Claims**



1. A digital phase shifter providing a delay of p/D T for an applied sampled signal $x(n)$, where T is the sampling period of $x(n)$ and p and D are predetermined integers comprising:

means for storing said applied sampled signal $x(n)$ and $(Q\text{-}1)$ past samples $x(n-1)$, $x(n-2)$,... $x(n-(Q\text{-}1))$ of said applied signal $x(n)$ where Q is a preselected integer;

coefficient memory means for storing at least one subset of coefficients $g_p(k) = h'(kD + (-p) + D)$ where $k = 0,1,2,...Q\text{-}1$ and + denotes modulo operation, said coefficients selected from a set of filter coefficients $h'(n)$ for an N' order low pass filter where $N'=QD$;

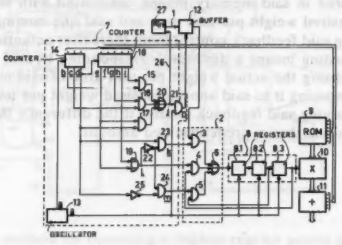
means for multiplying signal sample $x(n\text{-}k)$ by coefficient $g_p(k)$ to form the product $x(n\text{-}k)\ g_p(k)$; and

means for accumulating said products $x(n\text{-}k)\ g_p(k)$ over the range $k=0$ to $k=Q\text{-}1$.

3,997,773
INTERPOLATING DIGITAL FILTER WITH INPUT BUFFER

Hendrik Arie Van Essen; Nicolaas Alphonsus Maria Verhoeckx, and Wilfred André Maria Snijders, all of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Aug. 25, 1975, Ser. No. 607,611
Claims priority, application Netherlands, Sept. 16, 1974, 7412225
Int. Cl.² G06F *7/38, 15/34*
U.S. Cl. 235—156 **8 Claims**



1. A non-recursive interpolating digital filter comprising:

input means for supplying a sequence of input signals with a predetermined input sampling frequency;

buffer means, connected to said input means for storing an input signal for a variable time;

storage means, connected to said buffer means for storing a predetermined number of successive input signals, and having an output, comprising a shift register having a predetermined number of register sections, the last section in the direction of shifting being connected to said output of said storage means;

multiplying means for multiplying the signals stored in said storage means by weighting factors to produce a product signal;

an adding device, connected to said multiplying means for computing an output signal with a predetermined output sampling frequency, said output signal being the mathematical sum of product signals computed by said multiplying means; and

means for controlling the variable storage time of said buffer means so as to supply the input signals to said storage means at instants that are spaced by integral multiples of the period of said output sampling frequency, the ratio between the output sampling frequency and the input sampling being a factor M/L, M and L being integers and M being greater than L.

3,997,774
METHOD OF INCREASING THE SIGNAL-TO-NOISE RATIO OF A TIME-DEPENDENT SCANNING SIGNAL DURING PERFORMANCE OF A PERIODIC SCANNING METHOD

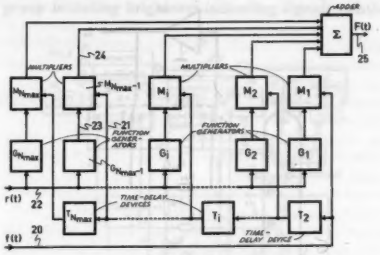
Hansjörg Schlaepfer, Winkel, Switzerland, assignor to Contraves AG, Zurich, Switzerland

Filed Oct. 14, 1975, Ser. No. 622,015
Claims priority, application Switzerland, Oct. 25, 1974, 14315/74
Int. Cl.² C06G *7/12*
U.S. Cl. 235—193 **7 Claims**

1. A method of increasing the signal-to-noise ratio of a time-dependent scanning signal produced during a periodic scanning operation, said operation comprising: (1) scanning a delineated and centered field line-by-line by means of a scanning device; (2) generating a time-dependent supplementary signal which corresponds to the spacing of the momentarily scanned location from the center of the field and possesses a

momentary value *r* and a maximum value R; and (3) performing successive line scanning operations in directions which change in each case through a predetermined angle and in such a manner that in accordance with the line width the neighboring lines contact one another at the boundary of the field and partially overlap within the field and at the center of the field completely overlap; the improvement comprising the steps of:

a. generating from the scanning signal a multiplicity of primary signals forming a sequence and which primary



signals in this sequence possess a time-delay which incrementally increases in each instance by a period of the line scanning;

b. generating from the supplementary signal a multiplicity of auxiliary signals by means of a corresponding number of function generators;

c. multiplying a respective auxiliary signal in a respective multiplier with a respective associated primary signal for producing a respective intermediate signal; and

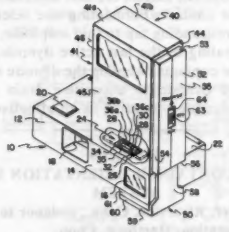
d. adding the intermediate signals in an adder to produce an output signal.

3,997,775

ELECTRONIC FLASH UNIT HAVING AN ADJUSTABLE MOUNTING MECHANISM AND MOVABLE ELECTRICAL PLUG

Jeffrey Richard Stoneham, Hilton, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Apr. 8, 1975, Ser. No. 566,633
Int. Cl.² G03B *15/02*
U.S. Cl. 240—1.3 **5 Claims**



1. In an electronic flash unit having a housing, a flashtube mounted within said housing, and electrical means for energizing said flashtube, the improvement comprising:

a. electrical contacts adapted to be electrically connected to the output terminals of a flash-firing mechanism;

b. means associated with said housing for defining an operational path;

c. means electrically connecting said electrical contacts to said electrical means; and

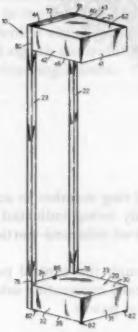
d. means mounting said electrical contacts for moving said contacts along said path while said contacts remain electrically connected to said electrical means to position said contacts over a continuous range of flash-firing locations relative to said flashtube.

3,997,776

INDIRECT LIGHTING FIXTURE

Alan J. Ruud, West Allis, Wis., assignor to Donald E. Goulet, Milwaukee, Wis., a part interest

Filed July 31, 1975, Ser. No. 600,642
Int. Cl.² F21V *33/00*; **F21M** *7/00*; **F21S** *1/12*
U.S. Cl. 240—2 SL **12 Claims**



1. An indirect lighting fixture comprising:

a hollow base having lamp operating electrical components therein;

a lamp compartment in registry with and disposed above said base and having a lamp and reflector means therein for directing light upwardly, said lamp compartment being open to accommodate light transmission on its upper side and closed against light transmission on its lower side;

said base and said components therein having a combined weight greater than the combined weight of said lamp compartment and said lamp and reflector means therein;

at least one hollow upwardly extending support leg connected near a side of said base and connected near a corresponding side of said lamp compartment for holding said lamp compartment above eye level;

electrical conductor means electrically connected between said components and said lamp and extending through said leg; and a line cord electrically connected to said components in said base.

3,997,777

INDICATOR WITH HUB LIGHTING SYSTEM AND 360° CONCENTRIC POINTERS

Frank F. Pucciarello, Newark, N.J., assignor to Weston Instruments, Inc., Newark, N.J.

Filed Dec. 18, 1975, Ser. No. 642,215
Int. Cl.² G01D *11/28*
U.S. Cl. 240—2.1 **10 Claims**

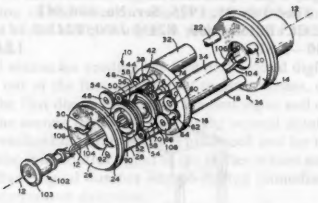
1. A hub lighted indicator comprising:

a dial having a central circular aperture in the face thereof;

a ring member mounted for rotation coaxially with said aperture;

lighting means positioned in said aperture and spaced from the edge thereof for directing light radially outward to illuminate said face of said dial;

pointer means having an end portion extending through said aperture between said lighting means and said edge for indicating a position on said face of said dial, the other end of said pointer means being attached to said ring means;



means for driving said ring member in accordance with the value of the quantity being indicated to cause a corresponding excursion of said end portion of said pointer means, and

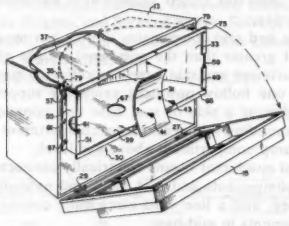
means extending through the central portion of said ring member for electrically connecting said lighting means to a source of electrical power.

3,997,778

LUMINAIRE OPTICAL SYSTEM

Donald Fieldstad, Jr., Greendale, and Donald Wandler, South Milwaukee, both of Wis., assignors to McGraw-Edison Company, Elgin, Ill.

Filed Oct. 10, 1975, Ser. No. 621,411
Int. Cl.² F21V 7/00
U.S. Cl. 240—41.35 E 15 Claims



1. An optical system for a luminaire comprising:

a first side reflective component formed with a reflecting surface and having a single axis of curvature, said axis of curvature lying in a vertical plane;

a second side reflective component formed with a reflecting surface and having a single axis of curvature, said axis of curvature lying in a vertical plane, said reflecting surfaces of said first and second side reflective components facing one another, with the back ends of said side reflective components being more closely spaced than the front ends thereof; and

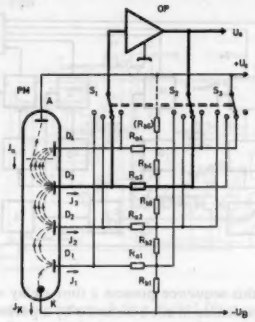
a back reflective component formed with a reflecting surface and having a single axis of curvature, said axis of curvature lying in a horizontal plane. said back reflective component positioned over the back ends of said side reflective components.

3,997,779

CIRCUIT DEVICE FOR SECONDARY ELECTRON MULTIPLIERS

Carl-Roland Rabl, Gottingen, Germany, assignor to Max-Planck-Gesellschaft zur Forderung der Wissenschaften e.V., Gottingen, Germany

Filed Oct. 24, 1974, Ser. No. 517,844
Claims priority, application Germany, Oct. 25, 1973, 2353573
Int. Cl.² H01J 39/12
U.S. Cl. 250—207 36 Claims



1. Circuit device for a multi-stage secondary electron multiplier, said multiplier having a source of primary electrons, a number of successive dynodes, and at least one electron collecting electrode as an anode, said circuit further comprising a voltage divider having a lower and an upper end terminal and successive taps, said divider comprising serially connected impedance means, said lower terminal being coupled to a negative supply voltage, said upper terminal being held at an essentially non-negative potential, said dynodes being coupled to said taps, the first dynode being the lowest one, said circuit further comprising signal coupling means which comprise at least one load resistor and an amplifier coupled to a signal output terminal and operating near reference zero potential, and gain switching means,

wherein at least two of said dynodes have individual load resistors, said load resistors being interconnected between said dynodes and said taps, said switching means comprising at least two series of fixed contacts connected to said dynodes and said taps, respectively, and at least three ganged movable contacts for changing the number of activated dynode stages, the first and the second one of said movable contacts connecting one selected dynodes and one corresponding tap to said amplifier, said selected dynode operating as the last active dynode, the third of said movable contacts coupling the dynode succeeding to said selected dynode to a positive drain voltage, said succeeding dynode operating as an effective anode.

3,997,780

LABELED CONTAINER ORIENTATION SENSING SYSTEM

Glenn C. Waehner, Riverside, Conn., assignor to United Technologies Corporation, Hartford, Conn.

Filed Dec. 31, 1975, Ser. No. 645,844
Int. Cl.² B65G 47/24
U.S. Cl. 250—223 R 18 Claims

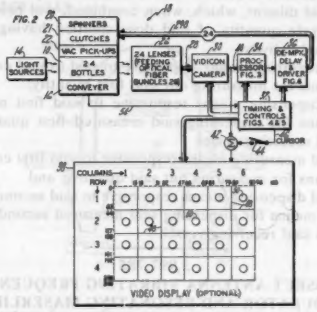
1. Apparatus for sensing the rotary orientation of a plurality of illuminated, labeled containers, each rotating at a respective station, comprising:

a plurality of light responsive means, one for each station, each providing intensity signal manifestations of light intensity of respective areas through which successive portions of the peripheral surface of the related container pass as the container rotates;

sampling means responsive to said light responsive means for sampling said intensity signal manifestations and providing brightness-indicating signals representative of the sampled intensity of said intensity signal manifestations being in excess of a given magnitude;

pattern means for presenting a group of pattern signals arranged to represent a pattern of brightness and darkness of successive areas of each of the labeled containers as it rotates into a desired orientation;

memory means responsive to said sampling means for storing said brightness-indicating signals in groups, each group including brightness-indicating signals relating to



all of the containers within a given time period, and for reading out the stored brightness-indication signals relating to one of said containers stored during said time period and a plurality of smaller, contiguous, preceding time periods, the read out of each set being timed with the read-out of said pattern means;

compare means responsive to said pattern means and to said memory means for comparing each set of signals read out of said memory means with signals of said pattern; and

output means responsive to said compare means to provide signals related to the rotary orientation of respective ones of the contaners.

3,997,781

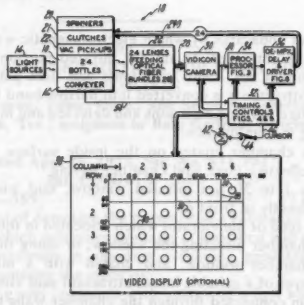
CONTAINER ORIENTATION SYSTEM CURSOR AND PROCESSING

Leonard A. Messman, Brookfield Center, Conn., assignor to United Technologies Corporation, Hartford, Conn.

Filed Dec. 31, 1975, Ser. No. 645,578

Int. Cl.² B65G 47/24

U.S. Cl. 250—223 R **6 Claims**



1. Apparatus for aligning a plural-item video image within the field of view of a vidicon camera comprising:

a vidicon camera;

a plurality of light sources disposed within the field of view of said vidicon camera in mutually dispersed relationship;

digital clock means for providing a plurality of time-related sequences of controlling signals, said digital clock means providing horizontal and vertical synchronizing signals and cursor signals;

digital processing means responding to said vidicon camera and to said digital clock means for processing the signal output of said vidicon camera in groups relating to distinct areas of the field of view of said vidicon camera delineated by selected ones of said digital clocking signals; and

video display means responsive to the signal output of said vidicon camera and to said horizontal and vertical synchronizing signals and said curosor signals from said digital clock means to provide a visual indication of said distinct areas in the field of view of said vidicon camera concurrently with a visual indication of at least a portion of the selected signals controlling the group processing by said digital processing means.

3,997,782

ROTARY PULSE TRANSDUCER HAVING STATOR SEALING MEANS

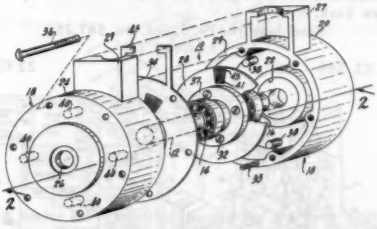
David L. Willits, Wadsworth, Ill., assignor to Dynapar Corporation, Gurnee, Ill.

Filed Sept. 6, 1974, Ser. No. 503,618

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 9, 1976

Int. Cl.² G01D 5/34

U.S. Cl. 250—231 SE **15 Claims**



1. An improved rotary pulse transducer comprisng:

a shaft;

a photoelectric rotor mounted on said shaft;

a housing having bearing means rotatably supporting said shaft, said housing being comprised of portions having opposing joinder surfaces;

an annular photoelectric stator located in alignment with said photoelectric rotor, said stator being sealingly interposed between the abutting contiguous joinder surfaces of said housing halves; and

photoelectric sensing means operatively associated with said photoelectric rotor and stator for ascertaining relative rotation of said rotor with respect to said stator.

3,997,783

METHOD FOR TESTING THE ADHESION BETWEEN THE RUBBER COMPOUND AND THE CORD FABRIC OF A PNEUMATIC TYRE

Jean-Louis Boutaine, Le Chesnay; Guy Courtois, Paris, and Jean-Claude Tanguy, Athis-Mons, all of France, assignors to Commissariat a l'Energie Atomique, Paris, France

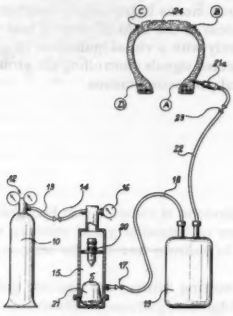
Filed Dec. 24, 1974, Ser. No. 536,082

Claims priority, application France, Dec. 27, 1973, 73.46597

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 16, 1976

Int. Cl.² G01T 1/161

U.S. Cl. 250—303 **9 Claims**



1. A method for determining whether a used tyre exhibits zones of detachment between the rubber compound and the cord fabric or zones of substantial porosity, wherein a gamma-ray emitting radioactive gas is injected under pressure into the body of the tyre in the zone of the layers of textile fibers which constitute the cord fabric, said gas is allowed to diffuse within the interior of the tyre and to accumulate at the defective points, and the radiation emitted at least at one point of the tyre is detected.

3,997,784

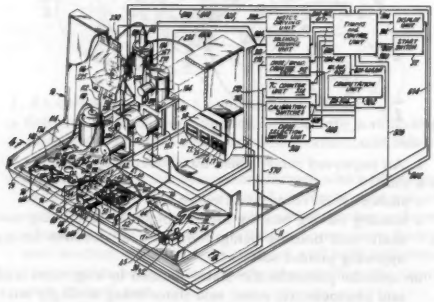
AUTOMATIC APPARATUS FOR DISPENSING RADIODIAGNOSTIC AGENTS AND METHOD THEREFOR

Thomas Picunko, and Edward Whittum Larrabee, both of Bronxville, N.Y., assignors to Union Carbide Corporation, New York, N.Y.

Filed June 16, 1975, Ser. No. 587,283

Int. Cl.² G01T 1/00

U.S. Cl. 250—328 **22 Claims**



1. Apparatus for dispensing a discrete quantity of a radioactive dose solution to a receiving vessel in response to a selection of the desired activity of said dose solution, said apparatus comprising:

reagent vessel means adapted to contain a radioactive source solution;

diluent vessel means adapted to contain a liquid diluent;

first detector means for measuring the activity of a radioactive medium for a predetermined time period;

first counting means responsive to said first detector means for automatically counting said activity of said radioactive medium;

first display means for displaying said counted activity;

dose selection means responsive to the selection of the desired activity for said dose solution, said activity selected being no greater than said displayed activity;

first calculating means responsive to said dose selection means for automatically calculating a first quantity of said radioactive source solution and a second quantity of said liquid diluent, which, when combined, will provide said discrete quantity of said dose solution having said selected activity;

first measuring means responsive to said to said calculating means for measuring out said first quantity;

first dispensing means responsive to said first measuring means for dispensing said measured first quantity into said receiving vessel;

second measuring means responsive to said first calculating means for measuring out said quantity; and

second dispensing means responsive to said second measuring means for dispensing said measured second quantity into said receiving vessel.

3,997,785

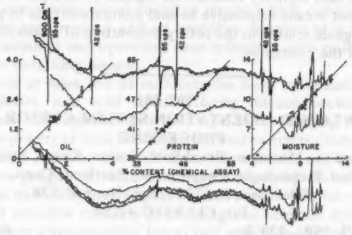
INSECT ANTENNA VIBRATING FREQUENCY MODULATOR AND RESONATING MASERLIKE IR EMITTER

Philip S. Callahan, Gainesville, Fla., assignor to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Filed Sept. 24, 1975, Ser. No. 616,212

Int. Cl.² G01J 1/00

U.S. Cl. 250—338 **17 Claims**



1. An apparatus by which electromagnetic wave energy in the near, intermediate and far infrared portion of spectrum from insect sex scent attractants and host plant or animal scent attractants is converted into narrow band high intensity maserlike infrared emissions and detected and measured comprising in combination:

a. a chamber coated on the inside surface with a silver reflective coat, said chamber having

b. a 1 to 30 μm infrared window, said window located directly in front of

c. a reed or pin vibrator which is located in the center of the chamber bisecting the window, or along the edge of the chamber window, and coated with a monomolecular layer of a suitable insect attractant said vibrating reed or pin connected through the chamber walls to

d. a low frequency oscillator with an adjustable duty cycle,

e. a tungsten filament heating element located behind the reed vibrator and centered in front of the back mirrored surface of the chamber and in the center of the front of the 1 to 30 μm IR window, said heating element wired to

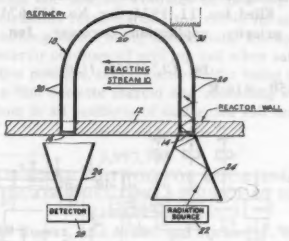
f. a variable heating unit, and

g. a means of detecting IR frequency or harmonics as they are stimulated and emitted from said chamber through said IR window.

3,997,786
SYSTEM FOR SPECTROSCOPIC ANALYSIS OF A CHEMICAL STREAM

James L. Lauer, Penn Wynne, and Melvin E. Peterkin, Brookhaven, both of Pa., assignors to Sun Oil Company of Pennsylvania, Philadelphia, Pa.

Filed Aug. 25, 1975, Ser. No. 607,657
Int. Cl.² G01N *21/26*
U.S. Cl. 250—343 **7 Claims**



1. A system for performing an on-stream analysis of the composition of a chemical stream and comprising:

a. a retainer wall means for containing a chemical stream on which an analysis is desired;

b. at least one window means mounted in said retainer wall means for allowing radiation to be transmitted through said retainer wall into the chemical stream;

c. radiation waveguide means supported adjacent to said window and extending into the flow of the chemical stream, said radiation waveguide means having apertures therein for allowing the chemical stream to continuously flow through it;

d. means for introducing a radiation beam through said at least one window means and into said radiation waveguide means whereby the radiation will be transmitted through the chemical stream within said radiation waveguide means, and depending upon the nature of the chemical stream, given wavelengths of the radiation beam will be selectively attenuated; and

e. means, positioned adjacent to said at least one window means, for detecting radiation which has traveled through the chemical stream, whereby the nature of the chemical stream may be ascertained by the radiation absorbed by the chemical stream.

3,997,787
APPARATUS AND METHOD FOR DETECTING EXPLOSIVES

Robert E. Fearon, Tulsa, Okla., and Serge A. Scherbatskoy, Fort Worth, Tex., assignors to Bain Griffith, Birmingham, Mich.

Filed Apr. 25, 1975, Ser. No. 571,702
Int. Cl.² G01M *23/00*
U.S. Cl. 250—359 **17 Claims**

1. A method of detecting the presence of a substance within a container, which substance contains at least first and second component materials in amounts exceeding predetermined amounts, comprising the steps of:

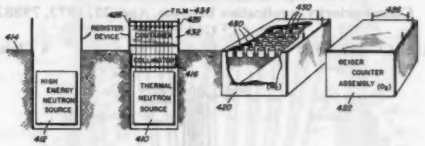
a. irradiating said container with energy of a first kind,

b. measuring the quantity of said first kind of energy passing through said container to obtain an indication corresponding to the amount of said first component material within said container,

c. storing said indication,

d. irradiating said container with energy of a second kind for transferring said second component material to a radioactive material,

e. removing said container from the source of said second kind of energy,



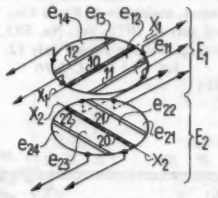
f. measuring the quantity of radioactive material within said container to obtain an indication corresponding to the amount of said second component material within said container, and

g. correlating said indications of the amounts of said first and second component materials to provide an output signal.

3,997,788
DEVICE FOR MONITORING THE POSITION, INTENSITY, UNIFORMITY AND DIRECTIVITY OF AN IONIZING RADIATION BEAM

René Boux, Paris, France, assignor to C.G.R.-Mev., Paris, France

Filed June 10, 1975, Ser. No. 585,506
Claims priority, application France, June 14, 1974, 74.20719
Int. Cl.² G01T *1/18*
U.S. Cl. 250—385 **11 Claims**



1. A device for monitoring the position, intensity, uniformity and directivity of a beam of ionizing radiation, comprising:

a stack of annular frames centered on an axis and forming an ionization chamber, said frames being provided with rabbeted confronting faces forming at least one annular recess on an inner wall surface of said chamber;

a pair of membranes of nonconductive material spanning said stack at opposite ends of said chamber; and

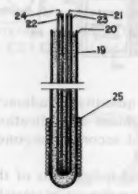
electrode means in said chamber connected in a circuit for detecting ionizing radiation, said electrode means including at least one disk transverse to said axis provided with a peripheral zone received in said annular recess, said disk being provided with a plurality of mutually insulated conductive elements intercepting different portions of a generally axially incident beam.

3,997,789

NEUTRON-IRRADIATION DOSE MONITOR COMPRISING THERMOCOUPLES

Francois Gaspard Mathieu, Mol, Belgium, assignor to Centre d'Etude de l'Energie Nucleaire, "C.E.N.", Brussels, Belgium

Filed Apr. 26, 1974, Ser. No. 464,444
Claims priority, application Belgium, Apr. 27, 1973, 798823
Int. Cl.² G01T 3/00
U.S. Cl. 250—390 4 Claims



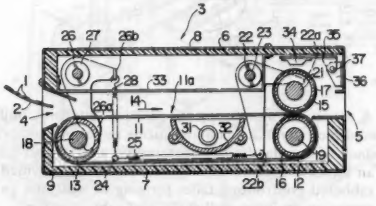
1. A neutron irradiation dose monitor comprising a first thermocouple comprising two dissimilar wires, each of these wires having two terminals, the two wires being jointed at one of their respective terminals in order to form a soldered junction, the two remaining terminals being free, the wires of said first thermocouple creating an electromotive force if the temperature of the soldered junction differs from the temperature of the two remaining terminals, said electromotive force being substantially independent of previous neutron irradiations of said first thermocouple, and a second thermocouple not connected to said first thermocouple comprising two different dissimilar wires, each of these wires having two terminals, the two wires being joined at one of their respective terminals in order to form a soldered junction, the two remaining terminals being free, the wires of said second thermocouple creating an electromotive force if the temperature of the soldered junction of this second thermocouple differs from the temperature of the two remaining terminals of said second thermocouple, the electromotive force created by the second thermocouple depending on previous neutron irradiations of said second thermocouple.

3,997,790

APPARATUS FOR HEAT-FIXING A TONER IMAGE

Shigeru Suzuki; Yasumori Nagahara, and Koichi Suzuki, all of Yokohama, Japan, assignors to Ricoh Co., Ltd., Japan

Filed July 8, 1975, Ser. No. 593,973
Claims priority, application Japan, July 12, 1974, 49-79992
Int. Cl.² G03C 5/16
U.S. Cl. 250—319 6 Claims



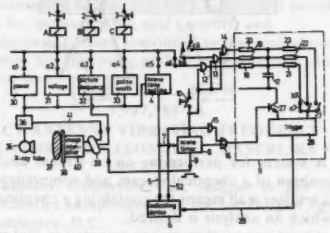
1. An apparatus for heat-fixing a toner image comprising, in combination, an endless belt having a transparency for infrared radiation and trained over rollers to form an upper run thereof for receiving thereon, and conveying, in a selected direction, a toner-image-bearing support sheet, having a toner-image-bearing surface facing upward and a back surface, facing downward to define a path of movement of the support sheet; means operable to move said belt in said direction; means disposed beneath said upper run of said belt and operable to radiate infrared energy through said upper run of said belt across said path of movement to the back surface of the support sheet; and reflecting means disposed on the side of said upper run of said belt opposite to that on which said radiating means is disposed, with respect to said path of movement, for reflecting infrared radiation received by said reflecting means toward said path of movement to the toner-image-bearing surface of the support sheet.

3,997,791

X-RAY DIAGNOSING DEVICE FOR PRODUCING X-RAY PHOTOGRAPHIC SERIES

Hans-Werner Winkler, Buckenhof, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany

Filed Jan. 11, 1974, Ser. No. 432,671
Claims priority, application Germany, Jan. 19, 1973, 2302691
Int. Cl.² H05G 1/30
U.S. Cl. 250—416 R 5 Claims



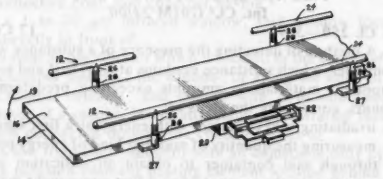
1. An X-ray diagnosing device for producing X-ray photographing series, particularly motion pictures, comprising an X-ray tube, an indicating device connected with said X-ray tube for indicating permissible scene duration and a calculator connected with its output with said indicating device and being electrically programmed corresponding to anticipated photographing programs, each program of the calculator representing the pause, required for the full scene duration after the last photographing series, for protecting the X-ray tube from overload, means for selecting the operative program of the calculator corresponding to the selected photographing program, and means for delivering a signal to the calculator according to the actual scene duration, the calculator supplying a zero output signal to the indicator during the pause determined by the selected program and a full scene duration signal after the termination of this pause.

3,997,792

X-RAY TABLE HAVING COLLAPSIBLE GUARD RAIL

Raymond M. Conrad, 745 Woodruff Road, Milford, Conn. 06460, and Charles R. Whitcomb, Rowley Road, Woodbury, Conn. 06798

Filed Dec. 30, 1974, Ser. No. 537,683
Int. Cl.² G01N 21/34
U.S. Cl. 250—444 10 Claims



1. The combination comprising an X-ray table and a collapsible guard rail assembly, said X-ray table having a table

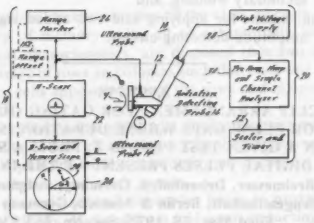
top including an upper surface and having a film cassette holder opening toward one side of the table top and loaded and unloaded from said one side for receiving a film cassette loaded thereinto and releasably retaining the film cassette below said table top and in close proximity thereto, said guard rail assembly including mounting means attached to said table at said one side, a hollow elongated top rail, supporting means connected to said top rail and said mounting means for movement between an active position wherein said top rail is supported a substantial distance above the plane of said upper surface by said supporting means and an inactive position wherein said top rail is supported generally adjacent said one side and in parallel relation to said one side by said supporting means and with said supporting means substantially wholly disposed within the interior confines of said top rail, and means for releasably retaining said top rail in its active position, said retaining means being substantially wholly disposed within the interior confines of said top rail when said top rail is in its inactive position, said cassette holder being accessible for loading a film cassette therein and unloading a film cassette therefrom in all positions of said guard rail assembly.

3,997,793

APPARATUS AND METHOD FOR LOCATING AND QUANTIFYING OR DIRECTING A SOURCE OF IONIZING RADIATION

William Leslie Rogers, Ann Arbor, and Michael A. Wainstock, Detroit, both of Mich., assignors to University of Michigan, Ann Arbor, Mich.

Filed Nov. 7, 1975, Ser. No. 630,046
Int. Cl.² G01N *21/00*
U.S. Cl. 250—491 **32 Claims**



1. An apparatus for detecting a source of radiation comprising:

ultrasound means for emitting ultrasonic waves along a first predetermined axis and for receiving a returned portion of said ultrasonic waves along said first predetermined axis for providing a signal representing said returned portion of ultrasonic waves;

signal processing means for said ultrasonic means output signal for identifying and locating a suspected source of radiation along said axis;

radiation detecting means for detecting ionizing radiation along a second predetermined axis; and

support means for supporting said ultrasound means and said radiation detecting means with a known relationship between said first and second predetermined axis so that said radiation detecting means can be guided to said suspected course of radiation by said ultrasound means.

3,997,794

COLLIMATOR

Richard N. York, 453 Bruce Rd., and David L. York, 100 Jefferson, both of Lockport, Ill. 60441

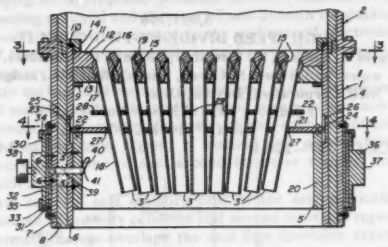
Filed Dec. 23, 1974, Ser. No. 536,957
Int. Cl.² G03B *41/16*
U.S. Cl. 250—505 **14 Claims**

2. A collimator comprising

a. a plurality of collimating tubes,

b. means for supporting said tubes for swinging movement relative to each other, and

c. means for simultaneously adjusting the relative position of all of said tubes relative to each other,



d. said second mentioned means comprising a plate

1. disposed between the ends of said tubes,

2. through which said tubes extend, and

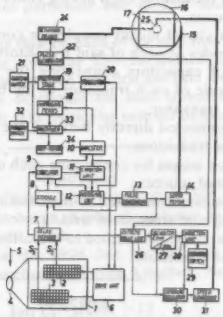
3. which is movable longitudinally of said tubes.

3,997,795

ARRANGEMENT FOR CONTROL OF AERIAL CAMERAS

Hans-Joachim Pohl; Otto Weibrecht, and Ulrich Wiesenburg, all of Jena, Germany, assignors to Jenoptik Jena G.m.b.H., Jena, Germany

Filed Apr. 23, 1975, Ser. No. 571,008
Claims priority, application Germany, May 13, 1974, 178451
Int. Cl.² H01V *39/12*
U.S. Cl. 250—578 **2 Claims**



1. An arrangement for determination of the image frequency, the drift and the exposure time for consequential setting of an aerial camera, comprising

an objective,

a projection plane,

said objective being adapted to image a surveyed area upon said projection plane,

at least one matrix of photoelectrical detectors for at least partial conversion of the image on said projection plane into electrical signals,

said matrix covering said projection plane at least partially, an information processing member being connected to said photo-electrical detector matrix for processing the signals derived from said matrix in accordance with a preselected program, and at least one

output member, for feeding the processed signals to said aerial camera,

said output member being connected to said information processing member to said aerial camera.

3,997,796

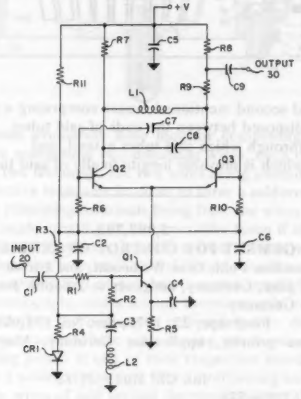
HIGH SPEED DIVIDE-BY-TWO CIRCUIT

David E. Sanders, St. Petersburg; Ramon P. Chambers, Clearwater, and Robert S. Gordy, Largo, all of Fla., assignors to NCR Corporation, Dayton, Ohio

Filed May 14, 1975, Ser. No. 577,373

Int. Cl.² H03K *21/00*

U.S. Cl. 307—220 R **3 Claims**



1. A high speed divide-by-two circuit comprising:

a pair of transistors, each having collector, emitter and base electrodes;

an input circuit means coupled in common to the emitter electrodes of each of said transistors;

a pair of capacitors connecting the respective collector electrode of each transistor to the base electrode of the other transistor;

a coil connected directly between the collector electrodes of said transistors;

resistance means for connecting each of said collectors to a potential source;

biasing means connected to the bases of said transistors for biasing said transistors; and

an output terminal coupled to the collector electrode of one of said transistors.

3,997,797

FREQUENCY DISCRIMINATING CIRCUIT

Hiroshi Sahara, Tokyo; Yutaka Tanaka, Yokohama, and Toshinobu Isobe, Tokyo, all of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Dec. 31, 1975, Ser. No. 645,873

Claims priority, application Japan, Jan. 16, 1975, 49-7374

Int. Cl.² H03D *3/26*

U.S. Cl. 307—233 R **2 Claims**

1. A frequency discriminating circuit comprising:

a. an input circuit;

b. an amplitude detecting circuit; and

c. a double tuned circuit connected between said input circuit and said amplitude detecting circuit, said double tuned circuit including,

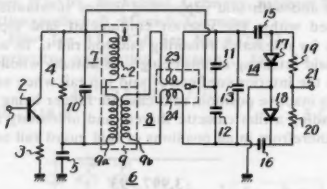
i. a transformer having a primary winding and a secondary winding,

ii. a first variable inductance element connected in series to said primary winding and magnetically shielded from said transformer,

iii. a first capacitor connected in parallel with a first series connection of said primary winding and said first variable inductance element to form a first resonant circuit together with said first series connection,

iv. a second variable inductance element connected to one end of said secondary winding, said second variable inductance element being shielded magnetically from said transformer,

v. a third variable inductance element connected to the other end of said secondary winding, said third variable inductance element being magnetically shielded from said transformer,



vi. a second capacitor connected in parallel with a second series connection of said secondary winding, said second and third variable inductance elements forming a second resonant circuit together with said second series connection, said second resonant circuit having a quality factor larger than that of said first resonant circuit,

vii. means for adding an input signal and two signals of opposite phases appearing at the both ends of said secondary winding, and

viii. means for applying said two added signals to said amplitude detecting circuit.

3,997,798

CIRCUIT ARRANGEMENT FOR GATING OUT PULSES AND/OR PULSE GAPS WHOSE DURATION IS SHORTER THAN A GIVEN TEST PERIOD T_p FROM A SEQUENCE OF DIGITAL PULSES PRESENT AT THE INPUT END

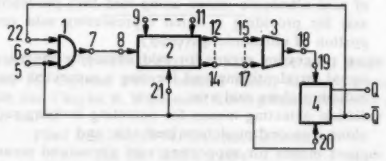
Fritz Breimesser, Deisenhofen, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Mar. 28, 1975, Ser. No. 563,230

Claims priority, application Germany, Mar. 29, 1974, 2415365

Int. Cl.² H03K *5/13*

U.S. Cl. 307—234 **11 Claims**



1. A circuit arrangement for gating out pulses or pulse gaps whose duration is shorter than a given test period t_p from a sequence of digital pulses applied at the input end with at least one first gate having at least two inputs, with at least one counter which may be set at a fixed initial value or at variable initial values, which receives a setting input for the setting of the counter to an initial value, and a counter input, with at least one decoding device which decodes the counted values in the counter, and which produces an output on which a pulse appears only if there is a specifiable but fixed counted value, and with at least one binary storage element having at least two inputs, whereby the output of the gate is connected to a counter input of said counter, and said output of the decoding

device is connected to an input of the binary storage element, and whereby a first input of the first gate is connected to the setting input of the first counter, and to the second input of the binary storage element, and wherein the first gate receives a third input which is connected to the $\overline{Q}$ output of the binary storage element.

3,997,799

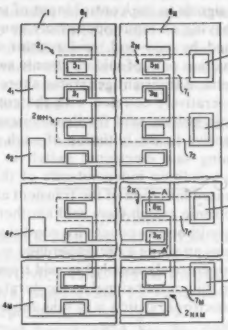
SEMICONDUCTOR-DEVICE FOR THE STORAGE OF BINARY DATA

Roger T. Baker, Box 240, Parsippany Troy Hills, N.J. 07878

Filed Sept. 15, 1975, Ser. No. 613,189

Int. Cl.² H03K *5/00, 3/353;* **H01L** *29/78*

U.S. Cl. 307—238 **7 Claims**



1. In a random access memory of the class wherein

a plurality of memory cells, all of substantially identical electrical characteristics, are disposed in a two dimensional array of rows an columns such that each one of said memory cells appear in one of the rows and in one of the columns,

said memory being comprised of a semiconducting material, a plurality of first electrodes, a plurality of second electrodes, a plurality of row conductive means, and a plurality of column conductive means,

said first and said second electrodes being in proximity to and electrically insulated from said semiconducting material, and

each of said memory cells being comprised of one of said first electrodes and one of said second electrodes, and

said row conductive means being electrically connected to the said memory cells such that the said first electrodes of all of those said memory cells appearing in the same one of the said rows are connected in common, and

said column conductive means being electrically connected to said memory cells such that the said second electrodes of all of those said memory cells appearing in the same one of the said columns are connected in common,

in each of the said memory cells, a first inversion region is formed in the semiconducting material by maintaining the electrical potential between each of the said first electrodes and the said semiconducting material within an appropriate range of potentials,

to store a 0 in any one of the said memory cells, a relatively small number of minority carriers is stored in the said first inversion region of that said one memory cell, and

to store a 1 in any one of the said memory cells, a relatively large number of minority carriers is stored in the said first inversion region of that said one memory cell, and

in said memory, the minimum time interval required to enter datum in any particular one of said memory cell is substantially independent of the location of that said one memory cell, and

in said memory, the minimum time interval required to recall the datum stored in any particular one of said memory cells is substantially independent of the location of that said one memory cell,

a method of non-destructively recalling the data stored in any particular one of said columns of memory cells comprising the steps of

applying an appropriate potential between said semiconducting material and that one of said column conductive means which is connected to the said second electrodes of those said memory cells in said particular column of memory cells, such that

within each of said memory cells in said particular column of memory cells, a second inversion region in said semiconducting material is formed such that each one of said second inversion regions is isolated and distinct from every other one of said second inversion regions, and such that

within each of said memory cells in the said particular column of memory cells, the said second inversion region formed therein overlaps the said first inversion region formed therein, such that minority carriers stored in the said first inversion region in each particular one of said memory cells in said particular column of memory cells, transfer to and remain within the said second inversion region formed in said particular one memory cell,

transferring back to within each of said first inversion regions in said particular column of memory cells substantially the same number of minority carriers stored therein just prior to the previously described transfer of said minority carriers from said first inversion regions to said second inversion regions, by applying a second appropriate potential between said semiconducting material and that one of the said column conductive means which is connected to the said second electrodes of those said memory cells in said particular column of memory cells, such that said second inversion regions are extinguished and such that upon extinguishing said second inversion regions, most of any minority carriers which had transferred from a particular one of said first inversion regions to a particular one of said second inversion regions transfer back to said particular one of said first inversion regions,

utilizing the charge flow on each of the said row conductive means resulting from the aforementioned transfers of minority carriers between said first and said second inversion regions to determine the data stored in the said memory cells in said particular column of memory cells.

3,997,800

FLIP-FLOP CONTROLLED CLOCK GATING SYSTEM

Alexander Bain, Edinburgh, Scotland, assignor to Burroughs Corporation, Detroit, Mich.

Filed May 15, 1975, Ser. No. 577,957

Claims priority, application United Kingdom, Nov. 6, 1974, 48053/74

Int. Cl.² H03K *5/13*

U.S. Cl. 307—269 **17 Claims**

1. A clock pulse gating system having two modes of operation, comprising:

A. a clock pulse input terminal for inputting a train of clock pulses;

B. a clock pulse output terminal;

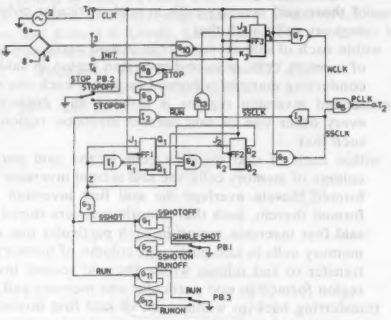
C. a single-shot clock circuit connected between said clock pulse input terminal and said clock pulse output terminal and including triggerable means selectively operable to allow the passage of only one clock pulse from said clock pulse input terminal to said clock pulse output terminal in one mode of operation of said gating system;

D. a clock inhibit circuit connected between said clock pulse input and output terminals and including:

i. a flip-flop network settable in a first condition enabling the passage of plural clock pulses from said clock pulse input terminal to said clock pulse output terminal in a second mode of operation of said gating system,

ii. and STOP actuator means selectively operable to actuate said flip-flop network to a second condition inhibiting the passage of said plural clock pulses from said clock pulse input terminal to said clock pulse output terminal whereby said second mode of operation is terminated;

E. and a clock enable circuit connected to said single-shot clock circuit and to said clock inhibit circuit, and includ-



ing RUN actuator means selectively operable to trigger said single-shot clock circuit, said RUN actuator having further means cooperating with and responsive to said pulse from said triggered single-shot circuit to restore said flip-flop network to its first condition enabling the passage of said plural clock pulses from said clock pulse input terminal to said clock pulse output terminal in said second mode of operation.

3,997,801

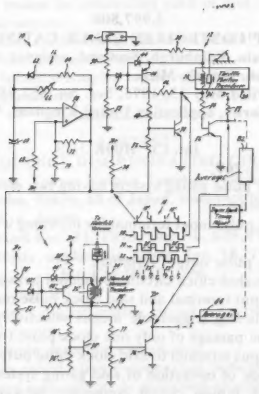
TRANSDUCER CIRCUITS FOR PROVIDING PULSES WHOSE WIDTHS ARE REPRESENTATIVE OF MECHANICAL INPUT SIGNALS

LaVerne Andrew Caron; Lawrence William Tomczak, both of Sterling Heights, and Frederick William Crall, Farmington, all of Mich., assignors to Chrysler Corporation, Highland Park, Mich.

Filed Mar. 17, 1975, Ser. No. 559,203

Int. Cl.² H03K *3/26*; F02P *5/04*; F02B *3/00*

U.S. Cl. 307—308 **39 Claims**



1. A transducer circuit for generating an electrical output signal which is representative of a mechanical input signal comprising:

a coil, a resistor, an electronic switch having a control input and a controlled conduction path and means connecting said coil, said resistor and the controlled conduction path of said electronic switch across a D. C. power supply;

means for varying the inductance of said coil in accordance with said mechanical input signal;

a source of control signals;

means for supplying said control signals to the control input of said electronic switch to cause said electronic switch to switch from one conductivity condition to another conductivity condition in response to each control signal and in turn cause an electrical transient to be generated in said resistor and said coil, which transient exhibits a time constant which is a function of the resistance of said resistor and the inductance of said coil;

a feedback circuit independent of said means for supplying said control signals to the control input of said electronic switch and having an input operatively coupled with the circuit defined by said coil, said resistor and the controlled conduction path of said electronic switch to monitor each electrical transient generated therein and having an output operatively coupled with the control input of said electronic switch, said feedback circuit comprising means responsive to the initiation of each said transient for maintaining said electronic switch in said another conductivity condition independently of the control signal which caused initiation of the transient and for switching said electronic switch from said another conductivity condition to said one conductivity condition in response to the transient attaining a predetermined magnitude; and

output means operatively coupled in said transducer circuit for providing said output signal as the duration of time for which said electronic switch is in said another conductivity condition.

3,997,802

TEMPERATURE-COMPENSATED ZENER DIODE ARRANGEMENT

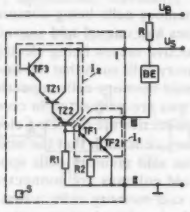
Wolfgang Hoehn, Kirchzarten, Germany, assignor to ITT Industries, Inc., New York, N.Y.

Filed Oct. 21, 1975, Ser. No. 624,640

Claims priority, application Germany, Nov. 2, 1974, 2452107

Int. Cl.² H03K *17/00*

U.S. Cl. 307—310 **6 Claims**



1. A temperature-compensated zener diode arrangement in the form of a semiconductor integrated circuit having first, second and third external terminals, which circuit consists of several transistor structures disposed in a common semiconductor body and interconnected by deposited metallizations, wherein the base-emitter pn junctions of the transistor structures are so connected in series with respect to the direction of the total current flowing during operation that part of them are operated in the reverse direction up to the breakdown region as zener diodes and the remainder in the forward direction as forward biased diodes, comprising:

first and second transistor structures each having base, emitter and collector terminals, said first and second transistor structures for acting as zener diodes and dis-

posed at least partly in a first isolating island of the semiconductor body, the emitter and collector of said first semiconductor structure and the collector of said second transistor structure coupled to said first external terminal, the emitter of said second transistor structure coupled to the base of said first transistor structure and the base of said second transistor structure coupled to said second external terminal;

third and fourth transistor structures, each having base, emitter and collector terminals, said second and third transistor structures at least partly disposed in a second isolating island of the semiconductor body for acting as forward bias diodes, the base of said third transistor structure coupled to the base of said second transistor structure and to said second external terminal, the collector of said third transistor structure and the collector of said fourth transistor structure coupled to said third external terminal, the emitter of said third transistor structure coupled to said second external terminal and to the base of said fourth transistor structure and the emitter of said fourth transistor structure coupled to said second external terminal; and

a bipolar element external to said semiconductor integrated circuit coupled between said first and third external terminals.

3,997,803

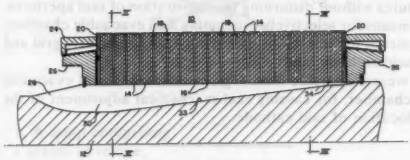
ROTOR MEMBER FOR DYNAMOELECTRIC MACHINES WITH LONGITUDINAL PASSAGES OF DECREASING AREA COMMUNICATING WITH RADIAL CORE VENTS

Anil K. Mishra, Monroeville, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Aug. 1, 1974, Ser. No. 493,994

Int. Cl.² H02K *9/00*

U.S. Cl. 310—59 **9 Claims**



1. A rotor member for a dynamoelectric machine including a generally cylindrical laminated rotor core carrying a winding thereon, said core having longitudinally spaced ventilating ducts extending radially therethrough, and said rotor member having passages for ventilating air extending longitudinally therethrough and communicating with said radial ventilating ducts, a shaft supporting said rotor core, and said longitudinal passages extending between the shaft and the rotor core, the cross-sectional area of said longitudinal passages decreasing from one end to the other.

3,997,804

MOUNTING FOR FLEXIBLE DIAPHRAGM PIEZOELECTRIC TRANSDUCER

Masaheko Tamura; Kiyononi Iwama, and Toshikazu Yoshimi, all of Tokerozawa, Japan, assignors to Pioneer Electronic Corporation, Japan

Filed Feb. 12, 1975, Ser. No. 549,347

Claims priority, application Japan, Feb. 18, 1974, 49-19526[U]

Int. Cl.² H01L *41/04*

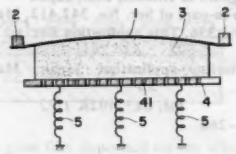
U.S. Cl. 310—8.2 **9 Claims**

1. A piezoelectric electro-acoustic transducer, comprising:

a support means having spaced, opposed fixing portions;

a flexible piezoelectric diaphragm having its entire peripheral portion supported by said fixing portions with the substantial vibration area of said diaphragm spanning the space between said fixing portions; and

a resilient backing member supporting and in backing surface contact with a major portion of said diaphragm vibration area, the resilient backing member area engaging the diaphragm being sized close to but smaller than said diaphragm vibration area and leaving only a minor



portion of said diaphragm vibration area, at the edge thereof, free of contact with said resilient backing member and extending beyond the backing member to said support means, and means located with respect to said support means for pressing said resilient backing means against only said major portion of said substantial vibration area and therewith tensioning said vibration area and curving the backed portion thereof.

3,997,805

RESILIENT ELECTRIC MOTOR BEARING SEAL

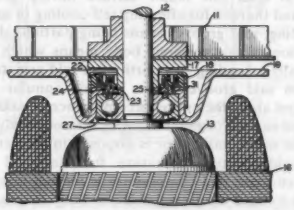
Richard W. Dochterman, Fort Wayne, Ind., assignor to General Electric Company, Fort Wayne, Ind.

Filed Apr. 8, 1974, Ser. No. 458,500

Disclosure was also published under second Trial Voluntary Protest Program on Feb. 24, 1976

Int. Cl.² F16C *33/78*; **F16J** *15/32*, *15/52*; **H02K** *5/16*

U.S. Cl. 310—90 **11 Claims**



1. A dynamoelectric machine comprising a rotating member, rotatable structure including a shaft extending axially through the rotating member, a stator and coil winding assembly having a bore for receiving the rotating member, an enclosure containing the stator and coil winding assembly, and an end shield through which the shaft extends, the dynamoelectric machine further comprising:

at least one bearing mounted to support the shaft for rotation;

a seal engaging member mounted on the shaft; and

a sealing member formed of a resilient material accommodated in a predetermined position relative to the seal engaging member and the end shield; the sealing member having a circumferentially extending wall defining an opening, the opening accommodating at least part of the rotatable structure with a radial clearance; the sealing member further having at least one sinuous in shape portion and a contact surface oriented crosswise relative to the shaft, with the contact surface effectively making mutual mating contact with the seal engaging member and with the sinuous in shape portion of the sealing member urging the contact surface thereof into effective mat-

ing contact between the contact surface of the seal and the seal engaging member even when the seal engaging member rotates in a misaligned manner.

3,997,806

ROTOR OF FLAT-TYPE MOTOR

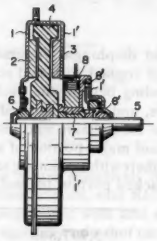
Kunihiro Noto, Katsuta, and Hiroaki Mizoguchi, Hitachi, all of Japan, assignors to Hitachi, Ltd., Japan

Continuation-in-part of Ser. No. 342,412, March 18, 1973, Pat. No. 3,863,336. This application Dec. 6, 1974, Ser. No. 530,281

Claims priority, application Japan, Mar. 22, 1972, 47-28147

Int. Cl.² H02K *1/22*

U.S. Cl. 310—268 **14 Claims**



1. A rotor for a flat-type motor comprising a flat-type armature, a commutator and a rotary shaft,

wherein said flat-type armature comprises a flat armature winding arranged in the form of a flat disk, said armature winding including radially extending coil portions, and insulating resinous body means for embedding said armature winding, said insulating resinous body means including at least one major surface having groove means formed thereon for effecting self-cooling of said armature winding, said groove means being partially disposed in a portion of said resinous body means which covers said radially extending coil portions of said armature winding.

wherein said groove means include annular grooves arranged along the entire circumference of said at least one major surface of said insulating resinous body means, and

wherein said commutator is disposed in the central portion of said flat-type armature for electrical connection thereto, and said commutator is formed integrally therewith by said insulating resinous body means, said rotary shaft being secured to said commutator at the center thereof to extend perpendicularly to said flat-type armature.

3,997,807

MECHANICALLY ADJUSTABLE ELECTRON GUN APPARATUS

George Herbert Needham Riddle, Princeton, and Robert Richard Demers, Trenton, both of N.J., assignors to RCA Corporation, New York, N.Y.

Filed Sept. 15, 1975, Ser. No. 613,534

Claims priority, application United Kingdom, May 27, 1975, 23172/75

Int. Cl.² H01J *29/46*

U.S. Cl. 313—449 **8 Claims**

8. A mechanically adjustable electron gun apparatus comprising:

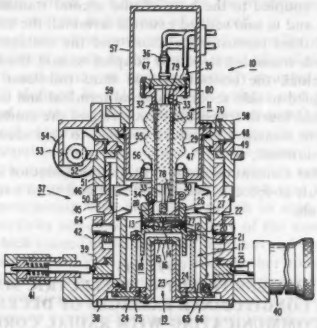
1. an evacuable chamber;
2. an electron gun pedestal within said evacuable chamber;
3. a cathode subassembly including a cathode for providing a beam of electrons along an axis of said electron gun;
4. a grid/anode subassembly including:

A. a grid having an aperture;

B. an anode having an aperture; and

C. means for fixedly mounting said grid to said anode; said mounting means serving to establish and maintain said apertures of said grid and said anode in spatial registration, while electrically isolating said grid from said anode;

5. means for securing said grid/anode subassembly to said electron gun pedestal; said grid/anode subassembly securing means serving, in common, to fixedly locate positions of said registered apertures of said grid and said anode within said evacuable chamber;
6. means, independent of said grid, said anode and said grid/anode subassembly securing means, for movably



supporting said cathode subassembly with respect to said electron gun pedestal; said cathode subassembly supporting means permitting the mechanical adjustment of the location of said cathode within said evacuable chamber with respect to said fixedly located positions of said apertures without disturbing the registration of said apertures;

7. means for selectively evacuating said evacuable chamber;
8. means for selectively energizing said anode, said grid and said cathode; and
9. means, operable from regions external to said evacuable chamber, for causing said mechanical adjustment of the location of said cathode.

3,997,808

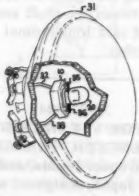
MOUNTING FOR SINGLE-ENDED LAMP

Joe J. Wojtowicz, Cleveland Heights, Ohio, assignor to General Electric Company, Schenectady, N.Y.

Filed June 30, 1975, Ser. No. 591,491

Int. Cl.² F21M *3/00;* **H01K** *1/46*

U.S. Cl. 313—113 **15 Claims**



1. A holder for single-ended inner lamps comprising:

a geometric solid of electrically insulating material bounded by at least one plane, said plane being a reference surface;

a central hollow portion defined by said solid, extending away from said reference surface, and adapted to receive the end of a single-ended lamp;

first and second bores through said solid and intersecting said reference plane, said first and second bores positioned on opposite sides of said hollow portion; and

a relief aperture in said solid, said aperture merging with said hollow portion to form an opening extending through said solid.

6. A lamp mount for use in an enclosed reflector comprising:

an incandescent inner lamp having conductive leads extending from the base thereof;

a holder comprising a geometric solid of electrically insulating material bounded in part by two parallel planes forming first and second reference surfaces, said hollow having hollow central portion, intersecting said first reference surface, adapted to receive the base of said inner lamp, and first and second bores on opposite sides of said hollow portion;

said inner lamp having the base thereof positioned in said hollow portion so that the filament of said inner lamp is spaced a predetermined distance from at least one of said reference surfaces; and

a mass of adhesive in said hollow portion for attaching said inner lamp to said holder.

3,997,809

DECORATIVE LAMP HAVING AN INTEGRAL BASE AND ENVELOPE

Robert J. Kyp, 526 Geneva Road, Glen Ellyn, Ill. 60137

Filed May 16, 1975, Ser. No. 578,038

Int. Cl.² H01K *1/22, 1/28, 1/44;* **H01R** *13/60*

U.S. Cl. 313—160 **14 Claims**

1. A lamp comprising

a sealed envelope,

a base extending from said envelope and integrally formed therewith such that said base and envelope comprise a single unit,

an illuminating filament contained within said envelope,

a stem positioned within said envelope and carrying said filament,

a pair of leads embedded in said stem the upper ends of which are connected to said filament, and

an electrical cord attached to said leads,

wherein the perimeter of said base is on a plane transverse to the longitudinal axis of said envelope, the transverse dimension of said base being at least substantially equal to the corresponding dimension of said envelope such that said perimeter supports said lamp in an upright position.

3,997,810

COLOR PICKUP TUBE FACE PLATE WITH OPAQUE SHADING STRIPES OVERLAPPING ADJACENT FILTERS

Ken Tsutsui, Tachikawa; Akira Sasano, Kodaira; Toshio Nakano, Tokyo; Haruo Matsumaru, Tokyo, and Takeo Nishimura, Tokyo, all of Japan, assignors to Hitachi, Ltd. and Hitachi Electronics Co., Ltd., both of, Japan

Filed Dec. 4, 1975, Ser. No. 637,574

Claims priority, application Japan, Dec. 4, 1974, 49-138423

Int. Cl.² H01J *31/00*

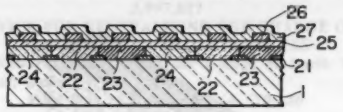
U.S. Cl. 313—384 **8 Claims**

1. A color pick-up tube face plate comprising,

a transparent substrate,

stripe-shaped opaque shading films formed on said substrate at desired intervals from each other,

stripe-shaped red-transmitting green-transmitting and blue transmitting color filters periodically distributed adjacent one another on the exposed portions of said substrate and said shading films, the boundary portions of said adjoining filters being positoned on said shading films;



a transparent glass film deposited on the whole surface of said filters,

transparent electrodes formed on desired portions of said glass film,

and a photoconductive layer deposited on the whole surface of the exposed portions of said glass film and said transparent electrodes.

3,997,811

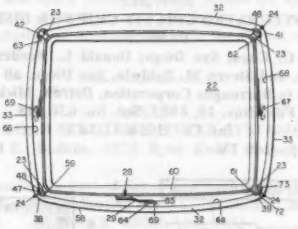
COLOR TELEVISION TUBE STRUCTURE AND METHOD OF MANUFACTURE

Elgin Megginson Tom, Toledo, and Roland L. Vogelpohl, Gahanna, both of Ohio, assignors to Owens-Illinois, Inc., Toledo, Ohio

Filed July 9, 1975, Ser. No. 594,531

Int. Cl.² H01J *29/07, 31/20*

U.S. Cl. 313—404 **24 Claims**



1. A faceplate for a color television picture tube comprising a glass plate of essentially uniform thickness over a major surface including an image viewing region and having at least two spaced cavities in the major surface thereof which is adapted to be mounted proximate an electron gun mounting for said tube, said faceplate being in combination with: a shadow mask color-selection device having a major surface contour matching the major surface of said plate; a plurality of mounting brackets having portions extending in a direction having a component normal to the major surface of said mask; index protuberances secured to said mounting brackets fitting into said two spaced cavities in said faceplate to maintain said proximate faceplate major surface and said mask major surface uniformly spaced.

3,997,812

DIGITIZING MATRIX FOR ELECTRON BEAMS

John F. Stahle, Baltimore, and Raymond E. Huber, Westminster, both of Md., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

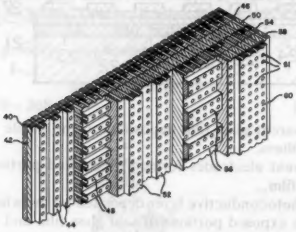
Filed Jan. 29, 1975, Ser. No. 545,236

Int. Cl.² H01J *29/10, 29/02*

U.S. Cl. 313—458 **7 Claims**

1. In a digitizing matrix for electron beams of the type

wherein electrons are permitted to pass through openings in the matrix to a target which is scanned with an electron beam and wherein the matrix comprises a series of stacked electrode units each formed by electrically-conductive layers extending transverse to each other and through which said openings pass; the improvement in said digitizing matrix of a low capacity single unitary structure including successive layers of thick dielectric material wherein each layer of dielectric material is



in the neighborhood of 0.5 to 1 mil thick, and in-between the successive layers of the dielectric material, crossed conductors forming a plurality of crossover areas, each of said crossover areas having a predetermined combination of crossed conductors for decoding said plurality of crossover areas, each of said crossover areas having at least one opening, whereby selected crossover areas permit electrons to pass therethrough and wherein said unitary structure is in the neighborhood of 0.015 to 0.020 inches thick.

3,997,813

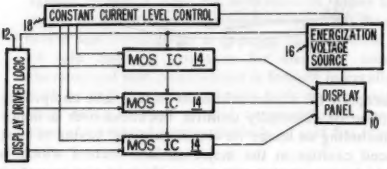
MOS INTEGRATED CIRCUIT CHIP FOR DISPLAY PANELS

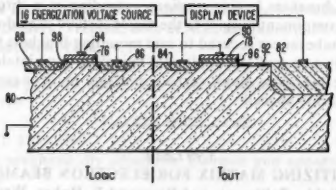
Stephen J. C. Chan, San Diego; Donald L. Henderson, Sr., Encinitas, and Steven M. Baldwin, San Diego, all of Calif., assignors to Burroughs Corporation, Detroit, Mich.

Filed Nov. 10, 1975, Ser. No. 630,218

Int. Cl.² H05B *41/14*

U.S. Cl. 315—169 TV **10 Claims**





1. A monolithic MOS integrated circuit chip for both selecting and driving display devices requiring high energization voltages, said chip comprising:

low-level logic circuit means for selecting display devices for energization, said logic means including transistors with a source region, gate region, and drain region fabricated on a semiconductur substrate;

driver circuit means for energizing the display devices selected by said logic means, said driver means having an output transistor with a source region, gate region, and drain region fabricated on said substrate, said drain region of said output transistor extending deeper into said substrate than the source region of said output transistor as well as the source and drain regions of said logic means, wherein said drain region provides a high breakdown voltage for the output transistor on said chip; and

said chip providing both high density low-level logic devices for selecting the display devices and an output driver capable of withstanding high breakdown voltages encountered in energization systems for said display devices.

3,997,814

DISCHARGE LAMP LIGHTING DEVICE

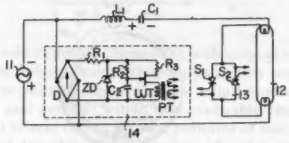
Makoto Toho, Kyoto, Japan, assignor to Matsushita Electric Works, Ltd., Osaka, Japan

Filed Mar. 21, 1975, Ser. No. 561,010

Claims priority, application Japan, Mar. 30, 1974, 49-36460

Int. Cl.² H05B *37/00*

U.S. Cl. 315—200 R **10 Claims**



1. A discharge lamp lighting device for use with an alternating current source comprising in combination, a discharge lamp having a lamp operating voltage substantially equal to the voltage of said alternating current source, a current limiting element interposed between said alternating current source and said discharge lamp, means including a switching element shunting said discharge lamp, closing of said switching element serving to energize a first circuit for accumulating energy from said alternating current source in said current limiting element, opening of said switching element serving to energize a second circuit for exhausting the accumulated energy from the current limiting element to said discharge lamp, and control means for opening and closing said switching element once during each half cycle of the alternating current source thereby to add the voltage across said current limiting element to the voltage of said alternating current source for producing a voltage in excess of the lamp operating voltage to light said lamp and maintain the lighted condition thereof.

3,997,815

STUDIO LIGHTING SYSTEM

Hans-Heino Decker, Vechelde, Germany, assignor to Rollei-Werke Franke & Heidecke, Braunschweig, Germany

Filed May 29, 1975, Ser. No. 581,974

Claims priority, application Germany, June 6, 1974, 2427254

Int. Cl.² H05B *41/32*

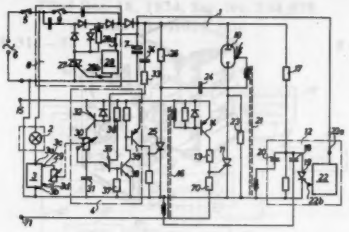
U.S. Cl. 315—241 P **13 Claims**

1. Studio lighting system comprising:

a. means for producing a continuous light for illuminating an object to be photographed before making a photographic exposure;

b. electronic flash means including a flash tube for illuminating said object during said exposure;

c. means for adjusting the intensity of said continuous light;
d. an electronic switch for interrupting a flash from said flash tube;
e. control circuit means for operating said electronic switch to interrupt a flash at an adjustable time after commencement thereof;
f. said control circuit means including time function means



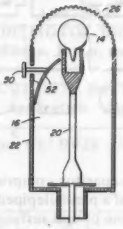
for determining said adjustable time at which said flash is interrupted; and
g. means for operatively connecting said time function means to said means for adjusting the intensity of said continuous light in such manner that the time of interrupting the flash is directly dependent upon the adjusted intensity of said continuous light before the photographic exposure is made.

3,997,816

STARTING ASSIST DEVICE FOR AN ELECTRODELESS LIGHT SOURCE

Paul Osborne Haugsjaa, Acton; William Henry McNeill, Carlisle, and Robert James Regan, Needham, all of Mass., assignors to GTE Laboratories Incorporated, Waltham, Mass.

Filed Apr. 21, 1975, Ser. No. 570,108
Int. Cl.² H05B *41/24*
U.S. Cl. 315—267 **8 Claims**



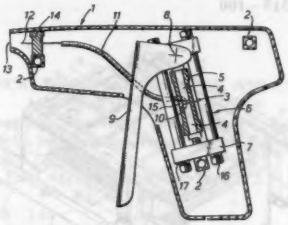
1. A light source including,
a. a source of power at a high frequency ranging from 100 MHz to 300 GHz,
b. an electrodeless lamp having an envelope made of a light transmitting substance and a volatile fill material disposed within the envelope, the fill material emitting visible light upon breakdown and excitation,
c. a termination fixture coupled to the source, the fixture including an inner conductor and an outer conductor disposed around the inner conductor, the lamp being positioned at the end of the conductors so that when high frequency power is applied to the fixture, breakdown and excitation of the lamp is initiated, and
d. an ultraviolet light source associated with the fixture such that the UV radiation excites the fill material within the electrodeless lamp causing starting of the electrodeless lamp, the ultraviolet light source being located in the region between the conductors and being electrically connected across the conductors in the fixture so that the ultraviolet light source is powered by the high frequency source and further including means for disconnecting power to the ultraviolet light source after the lamp is started.

3,997,817

DEVICE FOR NEUTRALIZING THE CHARGE ON STATICALLY-CHARGED SURFACES

Philip Edward Secker, University College of North Wales, Bangor, Wales

Filed May 21, 1975, Ser. No. 579,426
Int. Cl.² H05F *3/06*
U.S. Cl. 317—2 F **12 Claims**



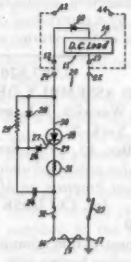
1. A device for neutralizing the charge on statically-charged surfaces comprising a piezo-electric crystal assembly, means for generating voltages across the crystal faces of the assembly, a sharp discharge point isolated at a position to inhibit flashover and spark production and means for applying the so-generated voltages to said discharge point whereby to cause ionization of an atmosphere in the region of said discharge point.

3,997,818

LOAD SELECTIVE POWER SYSTEMS

Lawrence E. Bodkin, 1833 Ryar Road, Jacksonville, Fla. 32216

Continuation-in-part of Ser. No. 376,312, July 5, 1973, abandoned. This application Mar. 17, 1975, Ser. No. 559,381
Int. Cl.² H02H *7/00, 1/02*
U.S. Cl. 317—33 SC **80 Claims**



1. In a power system the combination comprising a load circuit having a load and a unidirectional blocking means connected in series to said load for passing substantial current in one direction through said load and passing substantially no current in the opposite direction, and a supply circuit connected to said load circuit and adapted to connect said load circuit to an alternating current source, said supply circuit including a unidirectionally triggered switching means for supplying current from the alternating current source to said

load circuit in said one direction, said supply circuit further including means operatively connected to said switching means for substantially reducing the current flow through said switching means in said one direction whenever a load circuit providing current flow in said opposite direction is connected to said supply circuit.

3,997,819

HOUSING FOR ELECTRICAL COMMUNICATIONS AND MEASURING DEVICES

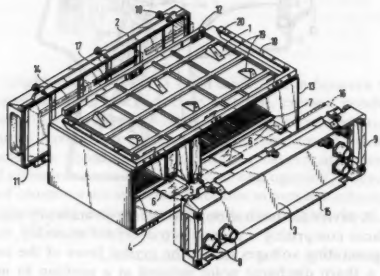
Hans-Joachim Eggert, Karlsfed; Otto Oberberger, Gilching, and Heinrich Zenkert, Munich, all of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Sept. 4, 1975, Ser. No. 610,299

Claims priority, application Germany, Sept. 9, 1974, 2443122

Int. Cl.² H05K *7/20*

U.S. Cl. 317—100 **7 Claims**



1. A housing for receiving a plurality of components used in electrical communications and measurement fields comprising: in combination, a six-sided housing member with open opposed front and rear sides closed by front and rear covers, the housing member mounted in a support frame by means of vibration accommodating mountings, the housing having at least one plug-in module receiving carrier assembly received therein adapted to receive modules from both the front and rear, said covers tightly closing said open sides, electrical insulating and moisture seal means between collars on inner-surfaces of said covers and the remainder of said housing, said covers recessed on housing inner faces thereof, the recesses providing heat dissipating fixture areas for attachment of high heat producing components, said front cover having operating elements and connection contacts on an exterior surface thereof protected by a protruding collar extending outwardly at peripheral areas of the exterior surface.

3,997,820

ANGLED ASSEMBLY OF PCB DIMMER

Joseph P. Stefani, Warwick, R.I., assignor to General Electric Company, New York, N.Y.

Filed Dec. 11, 1974, Ser. No. 531,566

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 16, 1976

Int. Cl.² H05K *7/14*

U.S. Cl. 317—120 **5 Claims**

1. A dimmer construction comprising;

a. a box-like housing having side, end and bottom walls, and having a top opening,

b. a plate-like mounting bracket disposed over said top opening as a closure for said opening,

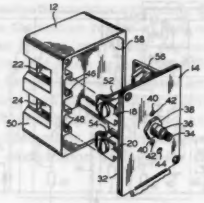
c. a printed circuit board mounted within said housing and extending back from said closure proximate one side wall of said housing,

d. a plurality of electronic dimmer components including a solid state switch, and potentiometer and a mechanical switch in said housing,

e. all of said components being mounted by the electric contact portions thereof to said printed circuit board,

f. the switch, potentiometer and solid state switch being mounted by portions other than current carrying portions thereof to said closure,

g. two conducting strips included in said housing,



h. each strip being soldered at one end to said printed circuit board,

i. and each strip being provided at its other end with a screw terminal,

j. said screw terminals being mounted in conforming side wall openings in the side wall opposite that proximate the printed circuit board.

3,997,821

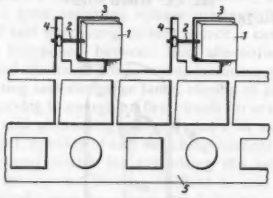
SOLID ELECTROLYTIC CAPACITOR WITH PLANAR CATHODE LEAD

Olaf Sternbeck, Bromma, Sweden, assignor to Telefonaktiebolaget L M Ericsson, Stockholm, Sweden

Continuation of Ser. No. 429,950, Jan. 2, 1974, abandoned. This application May 19, 1975, Ser. No. 578,818

Int. Cl.² H01G *9/00, 9/16;* **B01J** *17/00*

U.S. Cl. 317—230 **1 Claim**

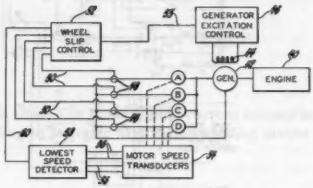


1. An electrolytic capacitor comprising an anode body of tantalum in the form of a parallelepiped having six rectangular and planar surfaces, one of said surfaces being covered with a dielectric layer, a planar cathode layer of conductive material covering said dielectric layer, a wirelike anode conductor of the same material as said anode body extending outward from the central portion of another of said surfaces which is perpendicular to said one planar surface, the axis of said wirelike anode conductor being perpendicular to said other surface, an anode lead and a cathode lead both having a laminar configuration, said anode lead being connected to said wirelike anode conductor, in such a way that the plane defined by said wirelike anode conductor and said anode lead lie in a plane parallel to the plane of said one planar surface and the axis of said wirelike anode conductor is orthogonal to the axis of said anode lead, said cathode lead being bent into three sections wherein the first and second outer sections are mutually parallel and the intermediate section making angles therewith, said first outer section being coplanar with said anode lead and said second outer section being coplanar with and affixed to said one planar surface of said anode body.

3,997,822
METHOD OF CONTROLLING LOCOMOTIVE WHEEL SLIP

Charles F. Logston, Jr., Naperville; Bruce R. Meyer, Western Spring; Alfred P. de Buhr, Downers Grove, and Benjamin C. Liebenthal, La Grange, all of Ill., assignors to General Motors Corporation, Detroit, Mich.

Filed Dec. 18, 1974, Ser. No. 534,079
Int. Cl.² H02P *5/50*
U.S. Cl. 318—52 **5 Claims**



1. A method of controlling wheel slip to a maximum value in an electric locomotive having at least one series traction motor driving a traction wheel and means for supplying electrical power to the motor comprising

determining the E/n versus motor current characteristics of the motor where E is the back emf and n is the motor rpm,

providing an electrical speed signal representing locomotive speed which is proportional to n for a non-slipping condition,

providing a current signal proportional to motor current,

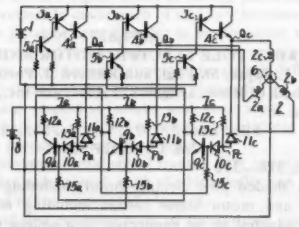
electrically computing the motor voltage required to drive the motor and its associated wheel to a desired maximum percent wheel slip utilizing the E/n characteristic, the speed signal and the current signal,

and controlling the maximum voltage supplied to the motor to the value of the computed voltage to thereby limit actual wheel slip to the value of the desired maximum percent wheel slip.

3,997,823
BRUSHLESS DC MOTOR DRIVING CIRCUIT

Yukihiko Machida, Mitaka, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Oct. 21, 1974, Ser. No. 516,383
Claims priority, application Japan, Oct. 30, 1973, 48-121991
Int. Cl.² H02K *29/00*
U.S. Cl. 318—138 **5 Claims**



1. A brushless DC motor driving circuit comprising:

a. a DC motor having a rotor formed of a magnet and a stator having a plurality of star-connected fixed windings;

b. a voltage source;

c. a plurality of switching means, one being connected between an end of each fixed winding and the voltage source, said switching means having a control input;

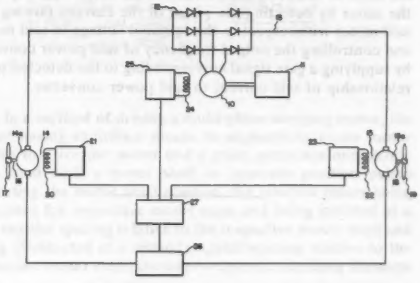
d. a plurality of position signal means, one being connected to the end of each fixed winding for detecting signals induced in said fixed winding by rotation of said rotor and providing a position signal; and

e. a plurality of switching control circuits, one being connected to each of said position signal means, an output of said one switching control circuit being coupled to one of the position signal means different than the one connected to said one switching control circuit, said output also being coupled to one of said switching means control inputs.

3,997,824
ELECTRICAL PROPULSION SYSTEM AND CONTROL ARRANGEMENTS THEREFOR

John A. Beverley, Schnectady, and Richard L. Koch, Scotia, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Apr. 20, 1973, Ser. No. 353,154
Int. Cl.² H02P *5/22*
U.S. Cl. 318—144 **8 Claims**



1. An electrical propulsion system mounted aboard a ship for providing propelling and braking forces to water-engaging propulsion means of the ship comprising:

an alternating current generator,

rectifying means connected to said generator for providing a direct current output,

a first direct current motor, said first motor including a first armature and a first field,

a second direct current motor, said second motor including a second armature and a second field,

said rectifying means and said first and second armature being connected in series in a closed loop,

manually operated means for controlling the polarity of the current applied to said first and second fields,

means for sensing the current in said closed loop when the polarity of current supplied to the field of one of the motors is reversed to cause it to operate as a generator during a dynamic braking operation, and

regulating means connected to said sensing means for receiving a signal from said sensing means and in response to said signal supplying a control signal to the field of at least one of said motors, said regulating means controlling the polarity and magnitude of the current supplied to said field for limiting the current in said closed loop to a predetermined maximum level by causing the voltage developed in the loop by the armature of said one motor to vary relative to the voltage developed by the other motor.

3,997,825

METHOD AND APPARATUS FOR CONTROLLING SYNCHRONOUS MOTOR

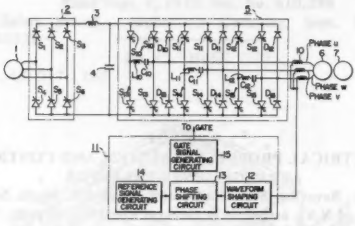
Kunio Miyasita; Hironori Okuda, both of Hitachi; Yasuyuki Sugiura, Takahagi; Takeo Maeda, Hitachi; Yasuo Matsuda, Hitachi, and Kazuo Honda, Hitachi, all of Japan, assignors to Hitachi, Ltd., Japan

Filed Oct. 7, 1974, Ser. No. 512,924

Claims priority, application Japan, Oct. 12, 1973, 48-113952

Int. Cl.² H02P 5/34

U.S. Cl. 318—171 9 Claims



1. A method of controlling a synchronous motor, having a rotor and a stator, driven by a power converter of voltage source type having a gate signal supplied thereto, comprising the steps of detecting the position of the rotor with respect to the stator by detecting the phase of the current flowing into said motor with respect to the terminal voltage of said motor, and controlling the output frequency of said power converter by supplying a gate signal corresponding to the detected phase relationship of said current to said power converter.

3,997,826

VALVE OPERATOR CIRCUIT WITH PROVISION FOR PRESETTING

Robert Mayer, Ardmore, Pa., assignor to Sun Oil Company of Pennsylvania, Philadelphia, Pa.

Division of Ser. No. 462,837, April 22, 1974, abandoned. This application Jan. 2, 1975, Ser. No. 537,875

Int. Cl.² H02P 1/40

U.S. Cl. 318—207 R 7 Claims

1. A control system for maintaining a process control element at a predetermined position, comprising:

a. reversible motor means for moving the process control element between positions;

b. a first control channel for energization of the motor in one sense in response to application of signals to said channel;

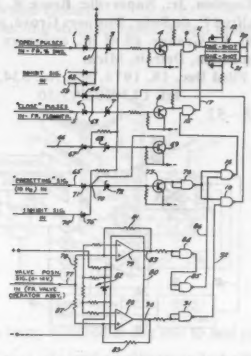
c. a second control channel for energization of the motor in another sense in response to the application of signals to said second channel;

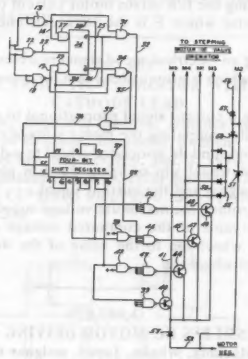
d. means for developing a voltage whose amplitude is representative of the position of the process control element;

e. means for producing a continuous presetting signal;

f. means, responsive to a developed voltage from said voltage developing means which is less than a predetermined voltage, for connecting the presetting signal producing means to one of the control channels so that the motor is energized in one sense;

g. means, responsive to a developed voltage from said voltage developing means which is greater than the predetermined voltage, for connecting the presetting signal producing means to the other control channel so that the motor is energized in the other sense.





3,997,827

SHADED POLE ELECTRIC MOTOR AND BRAKE

Robert A. Pajak, St. Paul, and Richard B. Porter, Bloomington, both of Minn., assignors to Honeywell Inc., Minneapolis, Minn.

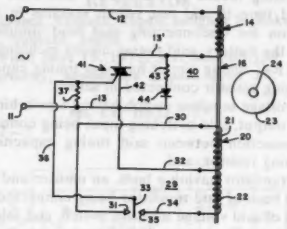
Filed Apr. 3, 1975, Ser. No. 565,188

Int. Cl.² H02P 3/24

U.S. Cl. 318—212 11 Claims

1. A shaded pole electric motor, including: motor rotor means and motor stator means including motor winding means adapted to be connected to a source of alternating current to power said motor; motor shading poles including shading coil means having circuit means to in turn control a current flow in said shading coil means to cause said motor rotor means to operate; bidirectional current control means connected to said motor winding means and controlled by said shading coil current flow to energize said motor winding means with alternating current to cause said motor rotor means to operate; and unidirectional current control means

connected to said motor winding means to pass a unidirectional current through said motor winding means to brake said



motor means when said bidirectional current control means is not conducting to energize said motor winding means.

3,997,828

COPY-REPEATER ARRANGEMENT AND METHOD OF ADJUSTING THE SAME

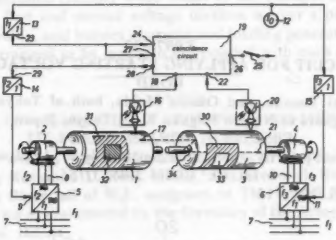
Jurgen Bottcher, Kaltenkirchen, and Uwe Selmer, Meldorf, both of Germany, assignors to Dr. -Ing. Rudolf Hell GmbH, Postfach, Germany

Filed Dec. 9, 1974, Ser. No. 531,083

Claims priority, application Germany, Dec. 13, 1973, 2361903

Int. Cl.² G05B *19/28*

U.S. Cl. 318—603 **9 Claims**



1. A method of effecting relative angular displacement between two rotary elements each of which is driven by an associated converter controlled synchronous motor, until respective marks on the peripheries of said elements are substantially angularly coincident, the steps comprising:

applying respective signal trains of timing pulse signals to said converters to cause each of said synchronous motors to rotate its associated element in synchronism with the respective signal trains, whereby the frequency of the respective signal trains of timing pulse signals defines the angular velocity of the associated element;

scanning said respective marks and generating a trigger signal when the mark of a respective element rotates passed a predetermined fixed point;

deriving from one of said signal trains a first counting train of counting pulse signals each of which defines an angular increment of the associated element;

applying said first counting train to an up/down counter in response to the generation of a trigger signal, whereby said first counting train causes said counter to count in one direction from a reference value;

disconnecting said first counting train from said counter in response to the generation of a subsequent trigger signal, whereby the count of said counter is a measure of the relative angular displacement between said elements;

generating a second counting train of counting pulse signals having a frequency lower than the frequency of said first counting train;

connecting said second counting train to said counter to cause said counter to count in another direction to said reference value; and

using said second counting train to add timing pulse signals to said one signal train to increase the angular velocity of its associated element until said counter has returned to said reference value and said trigger signals have reached coincidence to indicate that said marks are angularly coincident.

3,997,829

MULTI-PHASE STEPPING MOTOR CONTROLLER

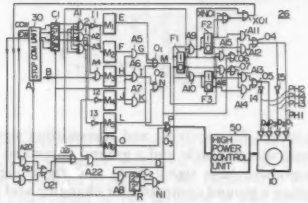
Masayuki Suzaki, and Shigeyuki Araki, both of Tokyo, Japan, assignors to Ricoh Co., Ltd., Tokyo, Japan

Filed Nov. 19, 1974, Ser. No. 525,132

Claims priority, application Japan, Nov. 20, 1973, 48-130540

Int. Cl.² G05B *19/40*

U.S. Cl. 318—685 **13 Claims**



1. In a method of driving a multi-phase stepping motor, the motor having excitation means to sequentially excite motor phases to drive the motor and a pulse generator operatively associated with a motor shaft to generate position pulses indicating the motor shaft position, the position pulses being generated for respective motor steps and being initiated at a first angular spacing relative to the respective motor steps and being terminated at a second angular spacing relative to the respective motor steps, the improvement comprising the steps of:

a. generating a timing pulse of a predetermined duration at a predetermined motor shaft spacing before a desired stopping step;

b. sensing for coincidence of the timing pulse and the position pulses; and

c. controlling the excitation means to change the phase excitation of the motor to impart torque to the motor shaft to decelerate the shaft during a time interval determined by a duration of coincidence of the timing pulse and one of the position pulses.

3,997,830

SATELLITE BATTERY RECONDITIONING SYSTEM AND METHOD

Richard Abbott Newell, Fair Haven; Joel Herman Bacher, Kendall Park; Herbert Walter Bilsky, Trenton, all of N.J., and Patrick Joseph Callen, Yardley, Pa., assignors to RCA Corporation, New York, N.Y.

Filed Nov. 27, 1974, Ser. No. 527,835

Int. Cl.² H02K *7/00*

U.S. Cl. 320—5 **8 Claims**

1. A system for reconditioning a secondary battery in a space vehicle, said vehicle having a solar array source of charging current comprising:

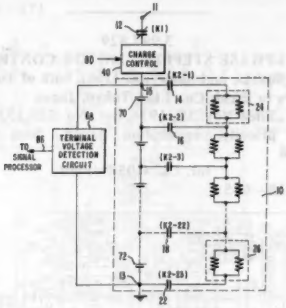
a secondary battery having a plurality of cells, a plurality of resistance networks each of said networks comprising a pair of substantially equal resistors wherein each of said

networks is associated with a respective one of each of said cells,

relay switch means for connecting one of said networks in shunt across its associated cell of said battery,

temperature sensitive means for detecting the voltage of said battery and providing a control signal manifesting said battery voltage as a function of the temperature of said battery,

means for regulating the flow of charging current from said solar array to said battery at a low charging rate,



signalling means for receiving and transmitting signals between said space vehicle and a ground command station,

means responsive to a signal from said signalling means manifesting a ground command for changing said regulating means to regulate the flow of charging current to a high charging rate, and

means responsive to said control signal from said temperature sensitive means for changing said regulating means to regulate automatically the flow of charging current to said said low charging rate as the voltage of said battery exceeds a critical value for a given temperature.

3,997,831

BATTERY CHECKER

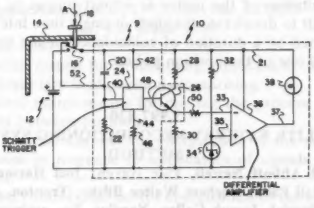
Clemens Hopfner, Stuttgart-Wangen, Germany, assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Oct. 16, 1975, Ser. No. 623,153

Claims priority, application Germany, Dec. 24, 1974, 2461342

Int. Cl.² H02J 7/00

U.S. Cl. 320—48 **1 Claim**



1. A battery checker for use in apparatus having a battery for supplying power to a load, comprising:

1. a battery checking circuit having

a. means for simulating the load on the battery, and

b. means for indicating the condition of the battery under the simulated load;

2. a test switch movable between first and second positions; and

3. timing means coupled to said test switch and responsive to movement of said test switch from said first position to said second position for electrically connecting said load simulating means to the battery and after a predetermined time if said test switch remains in said second position for disconnecting said load simulating means from the battery, said timing means including,

a. an R-C timing circuit having a timing capacitor and a timing resistor connected in series,

b. a voltage sensitive switch having a switching input and an output, said switching input being connected to the connection between said timing capacitor and said timing resistor, and

c. a transistor having a base, an emitter and a collector, the base of said transistor being connected to the output of said voltage sensitive switch, and said test switch being connected to said R-C timing circuit so that when said test switch is in said first position, said timing capacitor is discharged therethrough and when said test switch is in said second position, the battery is electrically connected to said battery checking circuit and said timing means therethrough.

3,997,832

CIRCUIT FOR APPLYING STARTING VOLTAGE TO LOAD

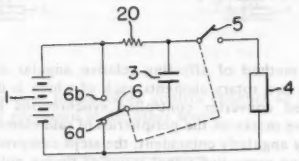
Hiroaki Tanaka, and Osamu Maida, both of Tokyo, Japan, assignors to Nippon Kogaku K.K., Tokyo, Japan

Filed July 9, 1975, Ser. No. 594,272

Claims priority, application Japan, July 17, 1974, 49-81212

Int. Cl.² H02M 3/06, 3/155

U.S. Cl. 321—15 **3 Claims**



1. A circuit for applying a starting voltage to a load wherein a higher voltage than a power source voltage is first applied to the load, and a voltage substantially equal to the power voltage is applied thereafter, said circuit comprising:

a power switch operative to couple the load to said power source when said switch is in a closed state;

a diode arranged to conduct current from said power source to said load;

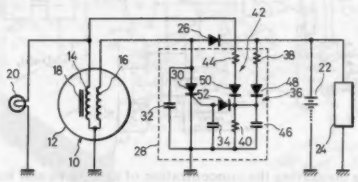
a capacitor having two terminals, one terminal thereof being coupled to said diode; and

switching means coupled to said diode, said power source and to the other terminal of said capacitor, said means being responsive to the state of said power switch, for charging said capacitor from said power source through said diode when said power switch is in an open state, and for serially coupling said power source, said capacitor and said load so that the sum of said power voltage and the capacitor voltage is applied to said load when said power switch is in a closed state.

3,997,833
VOLTAGE REGULATOR FOR A MAGNETO AC GENERATOR

Kimihiro Boyama, Numazu, Japan, assignor to Kokusan Denki Co., Ltd., Numazu, Japan

Filed June 19, 1975, Ser. No. 588,134
Claims priority, application Japan, June 24, 1974, 49-73178[U]
Int. Cl.² H02J 7/24
U.S. Cl. 322—7 **7 Claims**

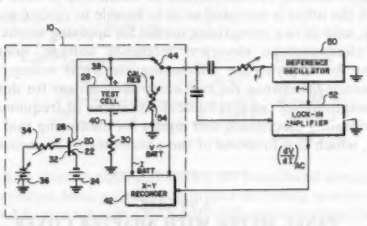


1. A voltage regulator for a magneto AC generator comprising a battery charging generator coil to charge a battery through a rectifier and a loading generator coil to drive loads, said voltage regulator comprising a first voltage divider to detect a voltage proportional to a terminal voltage of said battery; a second voltage divider to detect a voltage proportional to an output voltage of said loading generator coil; a controlled rectifier arranged to short-circuit said battery charging generator coil; and means to cause conduction of said controlled rectifier when either of the voltages detected by said first and second voltage dividers is over a predetermined value, said battery charging and loading generator coils being arranged to be magnetically bonded with each other.

3,997,834
STATE-OF-CHARGE INDICATOR FOR ZINC-MERCURIC OXIDE PRIMARY CELLS

John J. Winter, Atlantic Highlands; James T. Breslin, Asbury Park; Raymond L. Ross, Ocean, and Frederick Rothwarf, Toms River, all of N.J., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Oct. 20, 1975, Ser. No. 623,873
Int. Cl.² G01N 27/42
U.S. Cl. 324—29.5 **7 Claims**



1. The method of determining the state-of-charge of zinc-mercuric oxide type primary cells comprising the steps of

discharging new cells of said type at selected different rates to produce a plurality of discharged new cells of known state-of-charge value,

graphically producing a mean linear curve by plotting the effective differential DC resistance value of each of said discharged new cells versus the said known state-of-charge value,

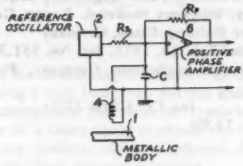
determining the effective differential DC resistance of a used cell whose state-of-charge is to be determined,

and locating on said mean linear curve the state-of-charge value corresponding to said used cell effective differential DC resistance, said corresponding value indicating the state-of-charge of said used cell.

3,997,835
METHOD AND APPARATUS FOR MEASURING DISTANCE

Seigo Ando, Kawasaki; Takeo Yamada, Yokohama, and Katsujiro Watanabe, Tokyo, all of Japan, assignors to Nippon Kokan Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 7, 1974, Ser. No. 521,812
Claims priority, application Japan, Nov. 14, 1973, 48-127235
Int. Cl.² G01R 33/00
U.S. Cl. 324—34 PS **10 Claims**

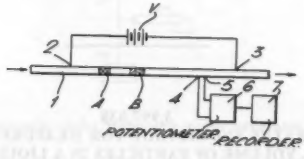


1. In a method of measuring the distance between a coil and a metallic body to be measured of the type wherein the distance is measured in terms of the variation in the impedance of said coil caused by the variation in said distance, the improvement which comprises the steps of connecting a resonance circuit constituted by said coil and a capacitor to the input side of a Q multiplier circuit, applying an AC signal having a predetermined frequency to said Q multiplier circuit, and adjusting the impedance or frequency characteristic of said resonance circuit by varying the gain of said Q multiplier circuit thereby equivalently adjusting the sharpness of said resonance circuit so as to compensate for the non-linear distance-inductance characteristic of said coil thereby linearizing the variation of the measuring output of said Q multiplier circuit.

3,997,836
DETECTOR FOR CHROMATOGRAPHS

Tatsuro Haruki, and Junichi Akiyama, both of Kyoto, Japan, assignors to Shimadzu Seisakusho Ltd., Japan

Filed Aug. 12, 1975, Ser. No. 603,929
Claims priority, application Japan, Aug. 29, 1974, 49-99583
Int. Cl.² G01R 27/14
U.S. Cl. 324—64 **13 Claims**



1. A detector for use in a chromatograph comprising: means for defining a passage through which a liguid is to be passed; said liquid including successive separate zones, each said zone containing a separate sample component, said passage being of a size adapted to maintain said zones in separation as the liquid flows through the detector; a first pair of electrodes spaced a predetermined distance apart from each other axially of said passage; means for arranging said electrodes in an

electrically conductive relation to the inside of said passage; means for impressing a voltage from a DC source across said electrodes; a second pair of electrodes spaced a predetermined short distance apart from each other axially of said passage and between said first spaced pair of electrodes, said second pair of electrodes being in electrical contact with said liquid in said passage; and means connected to said second pair of electrodes for measuring changes in the potential difference therebetween.

3,997,837

GAS ANALYSIS DEVICE

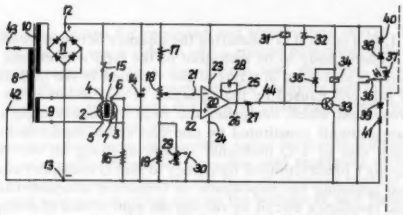
Gregor Betz, Dusseldorf, and Hugo-Peter Scholz, Essen, both of Germany, assignors to Fried. Krupp Gesellschaft mit beschrankter Haftung, Essen, Germany

Filed Feb. 20, 1975, Ser. No. 551,324

Claims priority, application Germany, Feb. 21, 1974, 2408218

Int. Cl.² G01N 27/14

U.S. Cl. 324—71 SN 16 Claims



1. In a system for analyzing a gas mixture, the system including a semiconductor gas measuring sensor, the improvement wherein said system comprises: a source of reference voltage; a differential amplifier having a non-inverting signal input and an inverting signal input, one of said inputs being connected to the output of said measuring sensor, and the other of said inputs being connected to said reference voltage source, said amplifier further having an output at which appears a voltage proportional to the difference between the voltages at its signal inputs and representative of the signal appearing at the output of said measuring sensor; indicating means; and circuit means connecting said output of said amplifier to said indicating means for causing said indicating means to produce an indication when the voltage of said output of said amplifier exceeds a selected value.

3,997,838

APPARATUS AND METHOD FOR MEASUREMENT OF TOTAL VOLUME OF PARTICLES IN A LIQUID SAMPLE

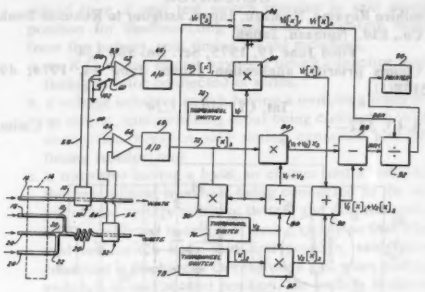
Morris H. Shamos, Bronx; Michael J. Brand, Somers, and William J. Calogero, Hopewell Junction, all of N.Y., assignors to Technicon Instruments Corporation, Tarrytown, N.Y.

Filed Apr. 14, 1975, Ser. No. 567,784

Int. Cl.² G01N 27/26, 27/00

U.S. Cl. 324—71 R 19 Claims

1. A method for determining the percentage total volume of particulates in a liquid sample, comprising the steps of: introducing a predetermined volume of a diluent having a known concentration of a particular ion into a predetermined volume of said sample having a known concentration of said particular ion, and determining the total liquid volume of said sample



including measuring the concentration of said particular ion in the diluted sample.

3,997,839

ELECTROMETER

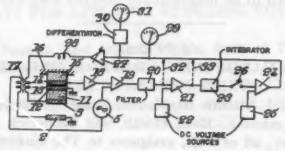
Gerard Dreyfus, Villebon-sur-Yvette, and Jacques Lewiner, Saint-Cloud, both of France, assignors to Agence Nationale de Valorisation de la Recherche (ANVAR), Paris, France

Filed Nov. 25, 1974, Ser. No. 526,733

Claims priority, application France, Nov. 23, 1973, 73.41853

Int. Cl.² G01R 5/28, 29/12

U.S. Cl. 324—109 25 Claims



1. Device for measuring an electrical parameter such as a quantity of electrical charges, or a quantity of another electrical parameter which is related to such a quantity of charges, present between two electrodes of which one is fixed and of which the other is mounted so as to be able to vibrate mechanically, said device comprising means for applying to one of the two electrodes an electrical reference voltage, energizing means for applying an alternating electrical voltage V_0 of frequency f_0 between the two electrodes; means for detecting the amplitude of the mechanical vibrations of frequency f_0 of the vibrating electrodes; and means for measuring said amplitude, which is a function of the parameter to be measured.

3,997,840

PANEL METER WITH ADAPTER COVER

David B. Pearson, Raritan, N.J., assignor to Weston Instruments, Inc., Newark, N.J.

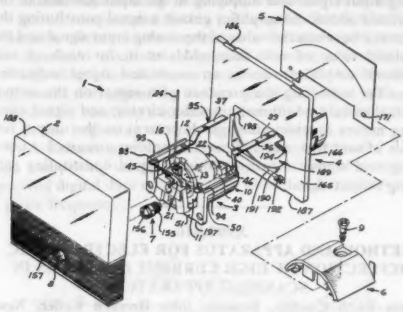
Division of Ser. No. 391,496, Aug. 24, 1973, Pat. No. 3,882,389, which is a division of Ser. No. 173,425, Aug. 20, 1971, Pat. No. 3,764,909. This application Dec. 12, 1974, Ser. No. 532,245

Int. Cl.² G01R 1/04

U.S. Cl. 324—156 13 Claims

1. An electrical indicating instrument adapted to be mounted on a panel having a circular opening of predetermined size comprising, casing means including wall means defining a chamber; instrument means in said chamber; said

wall means presenting an exterior casing profile of part circle configuration and of a size to pass through the circular panel opening; a cover adapted to be secured to the casing means and defining a component receiving chamber; said cover and casing means presenting a profile different from the part circle



configuration of the casing alone, and of a size to pass through the circular panel opening, so that the instrument can be mounted on the panel both with and without the cover, a scale, and means independent of said cover for securing the scale to the instrument, so that a complete operable indicating instrument can be provided both with and without the cover.

3,997,841

TIME DOMAIN EQUALIZER FOR BROADBAND COMMUNICATION SYSTEMS

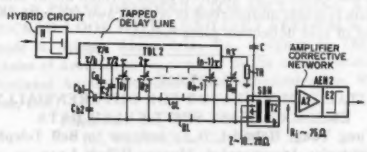
Wolfgang Borowski, Markgroningen, Germany, assignor to International Standard Electric Corporation, New York, N.Y.

Filed Sept. 23, 1975, Ser. No. 615,956

Claims priority, application Germany, Oct. 8, 1974, 2447930

Int. Cl.² H03H *7/36*

U.S. Cl. 325—42 **2 Claims**



1. A time domain equalizer device for broadband communication systems having delay line means including several taps displaced from each other by a time difference corresponding to a half cycle at the upper cutoff frequency of the signal to be corrected comprising: means for delaying the echos of the signal to be corrected by integral multiples thereof tapped off from said taps; echo adjusting voltage divider means formed from differential-capacitor plates and low input resistances for vectorially adding to or subtracting from said signal to be corrected; means coupling out the corrected signal including a capacitor; and corrected signal amplifying means whereby the frequency response resulting from said voltage divider means is corrected, said delay line means including means for delaying at least one echo by fractions of τ and adding said delayed echo to said signal to be corrected.

3,997,842

METHOD AND APPARATUS FOR MONITORING MODULATION DEVICES FOR VIDEO SIGNALS

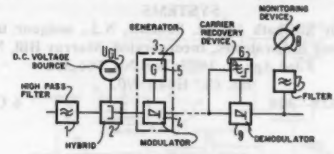
Günther Pexa, Steinebach, Woerthsee, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed May 19, 1975, Ser. No. 578,908

Claims priority, application Germany, May 31, 1974, 2426450

Int. Cl.² H04B *17/00*

U.S. Cl. 325—67 **2 Claims**



1. A method for monitoring modulation devices for video signals containing a high frequency portion and a direct current portion, comprising the steps of: removing the direct current portion of a video signal to obtain the high frequency portion; adding a selected direct current portion to the high frequency portion to obtain a predetermined signal; modulating the predetermined signal with a carrier and transmitting the modulated product; receiving the transmitted signal; recovering the carrier from the received signal; demodulating the received signal with the recovered carrier to obtain a direct voltage signal; and monitoring the direct voltage signal to determine equipment failure and phasing between the modulation and demodulation devices.

3,997,843

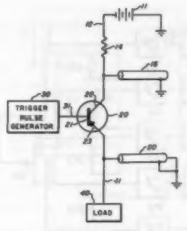
MONOCYCLE PULSE GENERATOR

Robert J. Wohlers, Orchard Park, N.Y., assignor to Calspan Corporation, Buffalo, N.Y.

Filed June 20, 1975, Ser. No. 588,756

Int. Cl.² H04B *1/04*

U.S. Cl. 325—105 **2 Claims**



1. A monocycle radio frequency pulse generator means including:
transistor means having a base, collector and emitter;
DC power source means connected to said collector to bias said base below cutoff;
dropping resistor means located intermediate said DC power source means and said collector to limit collector-emitter current during the off condition of said transistor;
open circuit delay line means located intermediate said dropping resistor means and said collector to define the collector load;
trigger pulse generator means connected to said base for

supplying a trigger pulse to said base and to cause said transistor to avalanche with a large surge of current coming from said open circuit delay line means to said emitter;

means for receiving a radio frequency pulse connected by an outlet line to said emitter;

shorted delay line means in shunt with said outlet line and defining the emitter load.

3,997,844

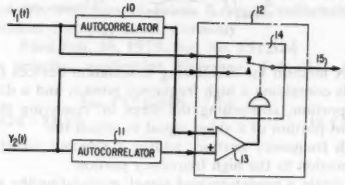
SIGNAL SELECTION IN DIVERSITY TRANSMISSION SYSTEMS

Nuggehally Sampath Jayant, Summit, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Apr. 9, 1975, Ser. No. 566,382

Int. Cl.² H04B 7/02

U.S. Cl. 325—304 6 Claims



1. In a communication system having a plurality of diverse signals carrying the same message, apparatus comprising:

means for developing the autocorrelation function value of each signal of said plurality of diverse signals; and

means for selecting the signal having the largest autocorrelation function value.

3,997,845

DEVICE FOR MODIFYING AN ANALOG ELECTRIC SIGNAL

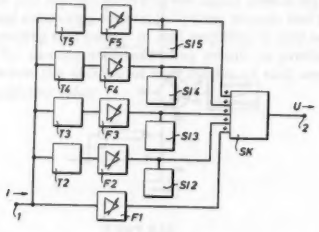
Lars Gunnar Wegstedt, Jarfalla, Sweden, assignor to Servo Chem AB, Vallingby, Sweden

Filed Apr. 21, 1975, Ser. No. 570,074

Claims priority, application Sweden, Apr. 25, 1974, 74056029

Int. Cl.² G06G 7/28

U.S. Cl. 328—143 6 Claims



1. A device for modifying an analog electric input signal and providing an analog electric output signal being a preselectable non-linear function of the input signal, comprising a first amplifier circuit and a plurality of additional amplifier circuits, each of said first and additional amplifier circuits having an input terminal and an output terminal and an individually variable gain factor and being operative to provide on said output terminal a signal proportional to the product of said gain factor and a signal present on said input terminal, when the signal on the input terminal has a first polarity, and no signal, when the signal on the input terminal has a second opposite polarity; means for supplying said analog input signal to the input terminal of said first amplifier circuit; for each said additional amplifier circuit an associated threshold circuit with an individually variable threshold value for receiving said analog input signal and supplying to the input terminal of the associated additional amplifier circuit a signal constituting the difference between the value of the analog input signal and the threshold value of said threshold circuit; for each of said additional amplifier circuits an associated signal indicating means for indicating the presence of a signal on the output terminal of said additional amplifier circuit; and signal combining means receiving the signals present on the output terminals of said first and additional amplifier circuits for combining said signals into a combined signal constituting said analog output signal.

3,997,846

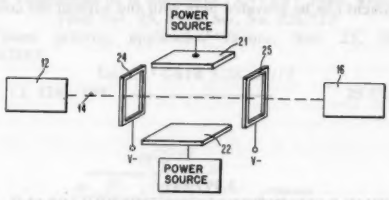
METHOD AND APPARATUS FOR ELECTROSTATIC DEFLECTION OF HIGH CURRENT ION BEAMS IN SCANNING APPARATUS

Dennis Keith Coultas, Beacon; John Howard Keller, Newburgh, and James Robert Winnard, Poughkeepsie, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed June 30, 1975, Ser. No. 592,013

Int. Cl.² H01J 29/56, 29/70

U.S. Cl. 328—229 6 Claims



1. In an ion beam apparatus including an ion source adapted to project a high current ion beam along a path within a vacuum region toward a target,

deflection plate means for deflection of said ion beam with respect to said target in a controlled fashion, and

field gate means arranged proximate said deflection plate means for excluding electrons from entering the region defined between said deflection plate means and said gate means whereby the electron cloud formed about said ion beam remains undisturbed in regions away from the location of said deflection plate means.

3,997,847

DIGITAL DEMODULATOR FOR DIFFERENTIALLY ENCODED PHASE-SHIFT-KEYED DATA

Shih Yung Tong, Holmdel, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Oct. 29, 1975, Ser. No. 626,659

Int. Cl.² H03D 3/00

U.S. Cl. 329—105 9 Claims

1. Apparatus for demodulating a received data signaling wave encoding data elements by phase differences between successive signaling intervals comprising:

means for hard limiting said received wave to display polarity and zero crossings thereof only;

shift register means having a plurality of stages for serially storing periodic samples of the output of said hard-limiting means extending over more than a signaling interval;

means for comparing the instant sample of the received wave at the input of said shift register means with samples from the present and succeeding signaling interval stored therein,

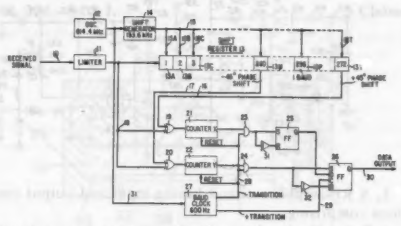
said comparing means generating complementary outputs corresponding to matches and mismatches respectively between compared samples;

counting means responsive to outputs of said comparing means representing mismatches between pairs of compared samples and having preassigned threshold counts;

bistable circuit means responsive to the attainment or not of threshold count levels by said counting means in each signaling interval, the output state of said bistable circuit means corresponding to decoded digital data; and

means for resetting said counting means to a reference state at the beginning of each signaling interval.

7. A demodulator for differentially phase encoded digital data comprising storage means for a plurality of samples of received digital data encoded on n phases of a carrier wave of a given frequency,



first and second exclusive-OR means for correlating the input to said storage means with previous inputs separated by one baud interval plus and minus π/n radians of said carrier wave to provide first and second bivalued correlation signals,

first and second resettable counter means responsive to said first and second correlation signals respectively and having preassigned threshold output count levels,

first and second bistable circuit means, and

means for gating the count-up state of said first and second counting means respectively to said first and second bistable circuit means at baud intervals to indicate whether or not the preassigned thresholds of said counter means have been crossed and for thereafter resetting said counter means to a reference condition, the resultant states of said bistable means representing decoded digital data.

3,997,848

LINEAR PHASE DEMODULATOR INCLUDING A PHASE LOCKED LOOP WITH AUXILIARY FEEDBACK LOOP

Ronnie R. Rippy, Alexandria, Va., assignor to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

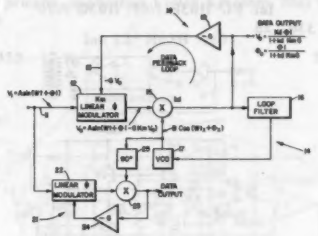
Filed Nov. 26, 1975, Ser. No. 635,531

Int. Cl.² H03C *3/22;* **H03D** *3/20*

U.S. Cl. 329—122 **11 Claims**

1. Apparatus for demodulating a phase modulated wave comprising a phase locked loop responsive to the phase modulated wave, said loop including: a voltage controlled oscillator, a phase detector responsive to the oscillator and the phase modulated wave for deriving an A.C. data output signal having a magnitude indicative of the phase of the phase modulated wave and a phase indicative of the phase of the modulated wave and for deriving an error signal indicative of the phase deviation between an input carrier wave component of the phase modulated wave and the voltage controlled oscillator, and a loop filter responsive to the error signal for deriving a control signal for the oscillator, means for controlling the oscillator phase in proportion to an integral of the error signal; and a feedback loop responsive to the data output signal for increasing the power of the carrier frequency component in the phase locked loop.

9. A circuit for linearly phase modulating an r.f. input in response to a modulation input signal comprising a parallel substantially all reactive network including: a variable reactance of a first type connected in series circuit with a first reactance of a second type opposite from the first type, the value of the variable reactance being controlled by the modulation input signal amplitude such that the reactance value is a non-linear function of the modulation input signal amplitude while the series circuit is approximately at resonance, a second reactance of the second type shunting the series circuit, said first and second reactances having values such that the series circuit has a reactance of the first type that is approximately in parallel resonance with the second reactance to provide compensation for the non-linear relationship between the value of the variable reactance and the modulation input signal; and means for coupling energy from the r.f. input to the parallel circuit and for coupling reflected r.f. energy from the parallel circuit to a load without coupling any substantial r.f. energy back to the r.f. input.



3,997,849

PUSH-PULL AMPLIFIER

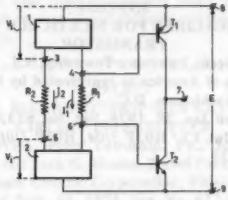
Werner Felix Thommen, Hausen, Switzerland, assignor to U.S. Philips Corporation, New York, N.Y.

Filed July 17, 1975, Ser. No. 596,662

Claims priority, application Netherlands, July 26, 1974, 7410080

Int. Cl.² H03F *3/183*

U.S. Cl. 330—13 **10 Claims**



9. A push-pull amplifier comprising, first and second voltage supply terminals, first and second current mirror circuits each comprising a common terminal, an input terminal and an output terminal with said terminals interconnected by semiconductor elements so that the current at the output terminal is in a fixed ratio to the current at the input terminal, means connecting the common terminals of said first and second current mirror circuits to said first and second supply terminals, respectively, means connecting a first resistor to the output terminals of the first and second current mirror circuits to form a first branch circuit across the supply terminals, a second resistor connected to the input terminals of the first and second current mirror circuits to form a second branch circuit across the supply terminals, first and second transistors

coupled to said supply terminals via a load impedance means, and means coupling the base electrodes of said first and second transistors to opposite terminals of said first resistor.

3,997,850

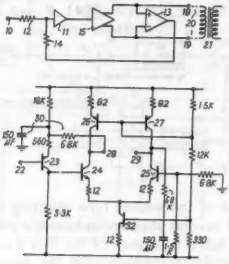
FLOATING ELECTRICAL OUTPUT CIRCUIT

Kenneth James Gundry, London, England, assignor to Dolby Laboratories, Inc., San Francisco, Calif.

Continuation of Ser. No. 395,609, Sept. 10, 1973, abandoned. This application Feb. 13, 1975, Ser. No. 549,679

Int. Cl.² H03F *1/08*; H03G *3/30*

U.S. Cl. 330—25 **2 Claims**



1. A floating electrical output circuit comprising

means for comparing an input signal with a feedback signal to derive a drive signal,

a differential current amplifier having two current paths fed in parallel from a constant current source common to the two paths and an input coupled to the output of said comparing means, two outputs coupled to said paths respectively and being responsive to said drive signal for varying the currents in the said paths differentially and providing differential current outputs at said two outputs respectively,

a pair of floating load terminals coupled to said outputs of said differential current amplifier means, and

a feedback amplifier circuit coupled across said load terminals to provide said feedback signal proportional to the voltage between said load terminals.

3,997,851

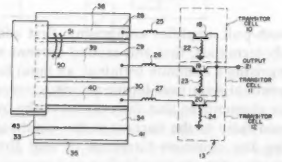
RF-DRIVE EQUALIZER FOR MULTICELL MICROWAVE TRANSISTOR

Franco Nicola Sechi, Lawrence Township, N.J., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Jan. 28, 1976, Ser. No. 653,049

Int. Cl.² H03F *3/04*; H01P *3/00*

U.S. Cl. 330—31 **7 Claims**



6. In an R.F. drive system for a power transistor pellet of the type which utilizes a microstrip feed line to couple a common input contact and the individual transistor bond wires, an improved microstrip feed, comprising a series of microstrip transmission lines, of uniform length, each coupled to the common input contact at one end and to a discreet transistor bond wire at the other end and differing in width so as to compensate for the unequal effects of mutual inductance among the bond wires.

3,997,852

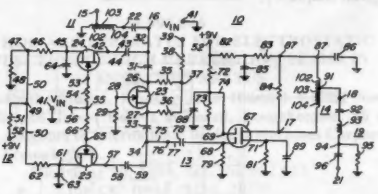
RF AMPLIFIER

Louis Wilfred Schornack, Arlington Heights, and William Frank Graf, Jr., Riverside, both of Ill., assignors to Motorola, Inc., Schaumburg, Ill.

Filed June 6, 1975, Ser. No. 584,559

Int. Cl.² H03F *3/16*

U.S. Cl. 330—35 **8 Claims**



1. A RF amplifier circuit having input and output connections comprising:

a first wide band step-up trnasformer having input and output connections and a relatively high impedance transformation ratio, the input connection of said first transformer being coupled to the input connection of said RF amplifier circuit;

a wideband field effect attenuator, having at least one series element, at least one shunt element, an input connection and an output connection, the input connection of which is coupled to the output connection of said first transformer;

a field effect amplifier, having a source, a drain and gate means, the gate means being coupled to the attenuator output connection;

a second wide band step-down transformer, having input and output connections and a relatively high impedance transformation ratio, the input connection of said second transformer being connected to the drain of said field effect amplifier, and the output connection of said second transformer being coupled to the output connection of said RF amplifier circuit.

3,997,853

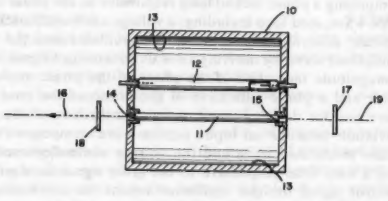
CHROMIUM-DOPED BERYLLIUM ALUMINATE LASERS

Robert C. Morris, Flanders, N.J., and Carl F. Cline, Walnut Creek, Calif., assignors to Allied Chemical Corporation, Morris Township, N.J.

Filed Nov. 29, 1974, Ser. No. 528,053

Int. Cl.² H01S *3/16*

U.S. Cl. 331—94.5 F **4 Claims**



1. In a laser capable of operating at room temperature comprising:

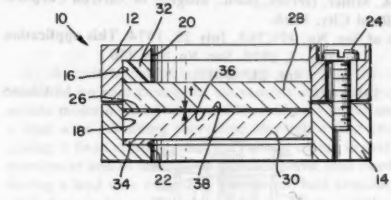
a. a laser host comprising at least one single crystal incorporating a dopant; and

b. means for exciting atoms of the dopant to emit coherent radiation, the improvement which comprises utilizing as the laser host, a single crystal of beryllium aluminate ($BeAl_2O_4$) doped with trivalent chromium ions, the single crystal being crystallographically oriented substantially along the *a—c* plane, at least 30° removed from the *b*-axis, and having a chromium doping concentration ranging from about 0.005 to 1.0 atom percent.

3,997,854
PASSIVE Q-SWITCH CELL

William W. Buchman, Los Angeles, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.

Filed Dec. 15, 1975, Ser. No. 640,620
Int. Cl.² H01S 3/02
U.S. Cl. 331—94.5 L **3 Claims**

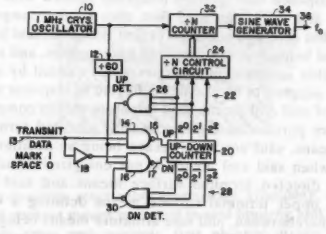


1. In a passive Q-switch cell defining a substantially cylindrical chamber containing a liquid Q-switching material including the dye complex bis(4-dimethylaminodithiobenzil) nickel, the improvement wherein said chamber has an axial extent not greater than approximately 0.25 mm.

3,997,855
DIGITAL FSK TIME RATE OF CHANGE MODULATOR

Harold Garth Nash, Tempe, Ariz., assignor to Motorola, Inc., Chicago, Ill.

Filed Dec. 24, 1975, Ser. No. 644,202
Int. Cl.² H04L 27/12
U.S. Cl. 332—9 R **8 Claims**



4. A digital FSK time rate of change modulator responsive to a digital input signal for generating a first or a second output frequency and for switching from one output frequency to the other in small increments over a predetermined time interval comprising:

a. means for generating a first and a second timing signal;

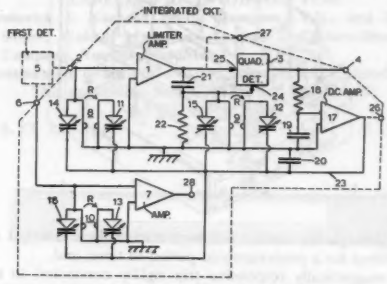
b. up-down counter means responsive to the second timing signal and having an output terminal means for counting up and down between a first state and a second state in response to the digital input signal; and

c. means for dividing the first timing signal by a variable division ratio in response to the digital output signal on said output terminal means and for converting that divided signal into a digitally approximated sine wave having the same frequency.

3,997,856
FREQUENCY DISCRIMINATOR CIRCUIT ARRANGEMENT

Jonathan Richard Canning, Burgess Hill, and Gordon Arthur Wilson, Reigate, both of England, assignors to U.S. Philips Corporation, New York, N.Y.

Filed May 1, 1975, Ser. No. 573,476
Claims priority, application United Kingdom, May 9, 1974, 20448/74
Int. Cl.² H03H 7/10
U.S. Cl. 333—17 R **5 Claims**



1. A circuit comprising a frequency discriminator, said discriminator including an input means for receiving an input signal having a frequency, said discriminator further including a first resonant circuit having a first adjusting signal input means for changing the resonant frequency thereof, and said discriminator still further including an output means for providing an output signal in accordance with the sign of any deviation between said frequencies; said circuit further comprising an integrator means coupled between said output means and said first adjusting signal input means for changing said resonant frequency towards the input signal frequency; a second resonant circuit having a second adjusting signal input means, said second adjusting signal input means being coupled to said integrator means for changing the resonant frequency of said second circuit simultaneously with that of said first circuit; each of said resonant circuits being integrated on a single semiconductor chip and including active circuit inductive components.

3,997,857
INTEGRAL MAGNETIC TRIP AND LATCH FOR A CIRCUIT INTERRUPTER

Raymond E. Wien, Penn Township, Pa.; John F. Cotton, Athens, Ga., and Jack G. Hanks, Bethel Park, Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Sept. 11, 1975, Ser. No. 612,609
Int. Cl.² H01H 75/12
U.S. Cl. 335—35 **8 Claims**

1. A circuit interrupter comprising:

a first stationary contact;

a second stationary contact separated from said first stationary contact;

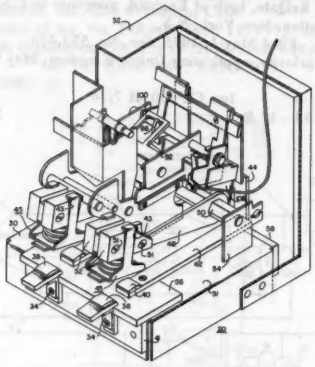
bridging contact means;

an elongated contact arm having said bridging contact means connected thereto, pivotal about an axis between a closed position wherein said bridging contact means completes an electric circuit between said first stationary contact and said second stationary contact and an open position wherein said bridging contact means is spaced apart from said first stationary contact and said second stationary contact;

primary latch means connected to said elongated contact arm when in a latching position latching said elongated contact arm in the closed position;

a secondary latch in a latched position keeping said primary latch means in the latched position;

bimetal actuating means responsive to current flow for unlatching said secondary latch when current flow



through the circuit interrupter exceeds a selected trip level for a predetermined period of time; and,

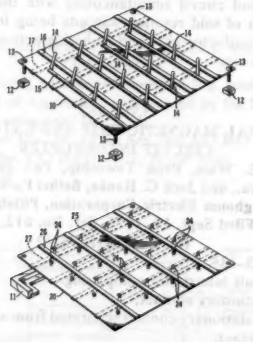
a magnetically responsive trip rigidly connected to said secondary latch having a portion disposed in proximity to said bimetal actuating means to be drawn toward said bimetal actuating means unlatching said secondary latch when current flow through said bimetal actuating means exceeds a high current overload level.

3,997,858

COORDINATE SWITCH CONSTRUCTION

Richard Miller Brownell, Upper Arlington, Ohio, assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Nov. 24, 1975, Ser. No. 634,482
Int. Cl.² H01H *67/26*
U.S. Cl. 335—112 **10 Claims**



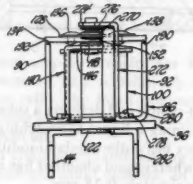
1. An electrical switch construction comprising a first and a second sheet arranged in spaced-apart, substantially parallel planes to present facing surfaces, at least one of said sheets being of a flexible material, a first and a second plurality of selection conductors mounted on at least one of said sheets and arranged in substantially orthogonal coordinates to define a coordinate array of crosspoints on both of said sheets, a plurality of electrical, magnetically responsive contact means arranged at said crosspoints, each of said contact means comprising a first substantially U-shaped element passing through said one of said sheets and in inductive coupling with at least one of each of said first and said second plurality of selection conductors intersecting at the crosspoint to present a first pair of contact legs at the facing surface of said last-mentioned sheet, and a second substantially "U" shaped element passing through the other of said sheets to present a second pair of contact legs opposite, respectively, said first pair of contact legs; and coordinate signal path conductors for interconnecting the U-shaped elements in respective coordinates on each of said sheets.

3,997,859

INTERMITTENT LOAD ENERGIZER ASSEMBLY

Gerald K. Miller, Hersey, Mich., assignor to Nartron Corporation, Reed City, Mich.

Division of Ser. No. 491,763, July 25, 1974. This application Apr. 3, 1975, Ser. No. 564,930
Int. Cl.² H01H *50/58*
U.S. Cl. 335—128 **13 Claims**

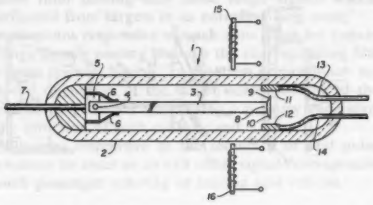


1. A relay assembly, comprising coil means adapted to at times be electrically energized, first core means carried generally within said coil means, second core means carried generally externally of said coil means, said second core means comprising first second and third upwardly directed legs with said first and second legs respectively having first and second upper terminal surfaces substantially coplaner with each other, said second core means further comprising a relatively lower disposed base portion integrally formed with said first second and third legs, said first core means comprising an upper first core end and a lower first core end, said lower first core end being supported by said base portion, and resiliently deflectable armature means operatively carried by said third leg and adapted to be at times deflected in response to energization of said coil means, said armature means comprising an armature portion having downwardly directed terminal surface means, said armature means being so positioned as to result when said coil means is not energized in said downwardly directed terminal surface means and said first and second upper terminal surface means defining a wedgelike space therebetween, and said armature means being effective when undergoing deflection due to said coil means being energized for causing downwardly directed terminal surface means to more nearly approach a parallel relationship with said first and second upper terminal surfaces, upon energization of said coil means said first leg being effective to define a first magnetic flux loop through said first leg said armature portion said first core means and that portion of said base generally between said first core means and said first leg while said second leg being effective to define a second magnetic flux loop through said second leg portion said first core means and that portion of said base generally between said first core means and said second leg while said third leg being effective to define a third magnetic flux loop through said third leg said armature portion said first core means and that portion of said base generally between said first core means and said third leg.

3,997,860
MINIATURE MEMORY BIT HOLDER HAVING ARMATURE PRONGS SELECTIVELY PIERCING THE ASSOCIATED CONTACTS

Jonathan Todd Kaplan, 237 E. 20th St., New York, N.Y. 10003

Filed Sept. 25, 1975, Ser. No. 616,558
Int. Cl.² H01H 1/66, 51/00
U.S. Cl. 335—154 9 Claims

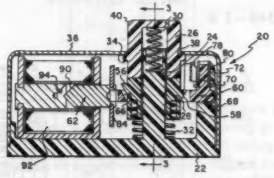


1. A switch device comprising a casing, an armature mounted on said casing for movement within a given plane, means mounting said armature for said movement and having a lead wire extending therefrom through a first end of said casing; a fixed contact mounted on said casing in said plane of movement and to the side of said armature, said fixed contact having a lead wire extending therefrom; said armature having at its free end a contact comprising a sharp metal prong extending in a direction toward said fixed contact; and means for selectively moving said armature toward and away from said fixed contact; said fixed contact being formed so as to be pierced by said prong permitting said prong to become embedded therein on contact therewith.

3,997,861
INTERLOCK CIRCUIT OVERRIDE RELAY

James R. Van Sickle, Mount Clemens, Mich., assignor to Essex International, Inc., Fort Wayne, Ind.

Filed June 12, 1975, Ser. No. 586,298
Int. Cl.² H01H 9/20
U.S. Cl. 335—161 21 Claims



1. An override reset relay comprising a housing, a pair of opposed contact means mounted in said housing and biased to a normal open rest position, first plunger means movably mounted in said housing engageable with one of said contact means and normally maintained in a rest position accommodating movement of said one of said contacts to its rest position, second plunger means movably mounted in said housing in engagement with the other of said contact means and normally maintained in a rest position locating said other of said contacts in its rest position, first latch means in said housing operable upon displacement of said first and second plunger means from their respective rest positions to an actuated position to prevent return of said second plunger means to its rest position upon return of said first plunger means to its rest position, said other of said contact means being maintained in an actuated position by said second plunger means when engaged by said first latch means and said one contact means being movable into contact with said other contact means in its actuated position upon return of said first plunger means too its rest position, and latch control means operable by successive energization and deenergization of an electric circuit through the closed contact means for restoring said second plunger means and both of said contact means to their respective rest positions.

3,997,862
LABELLED HIGH-VOLTAGE FUSE

Frederick J. Kozacka, South Hampton, N.H., and Erwin Salzer, Waban, Mass., assignors to The Chase-Shawmut Company, Newburyport, Mass.

Continuation of Ser. No. 390,019, Aug. 20, 1973, abandoned. This application June 6, 1975, Ser. No. 584,394
Int. Cl.² H01H 85/30
U.S. Cl. 337—241 2 Claims

1. A labelled high-voltage fuse including an insulating fuse tube, a pair of terminal plugs plugging the ends of said fuse tube and held in position by steel pins transversely projecting through said fuse tube into said pair of plugs; said fuse further including a pulverulent arc-quenching filler inside said fuse tube and fusible element means conductively interconnecting said pair of terminal plugs and submersed in said filler, said fuse tube having such a length as to result in a plateau-like zone of relatively high temperature between the ends of said fuse tube when said fuse is carrying current, wherein the improvement comprises a fuse tube unencumbered by the presence of a pair of metal furrules at the ends thereof and a pair of axially spaced band labels of a non-temperature resistant material adhesively affixed directly to said fuse tube at the regions normally occupied by a pair of ferrules outside said plateau-like zone of relatively high temperature and at points where the temperature of said fuse tube is relatively low when the fuse is carrying current, said pair of band labels being axially spaced from said plateau-like zone of relatively high temperature of said fuse tube, and each of said pair of band labels covering the radially outer ends of said steel pins of one of said pair of plugs.

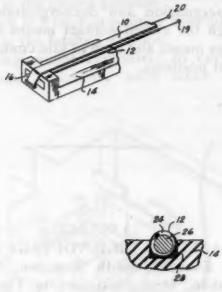
3,997,863
HELICALLY WOUND PITCH-DETERMINING ELEMENT FOR ELECTRONIC MUSICAL INSTRUMENT

David A. Luce, Clarence Center, N.Y., assignor to Norlin Music, Inc., Lincolnwood, Ill.

Filed Apr. 3, 1975, Ser. No. 564,753
Int. Cl.² H01C 9/00
U.S. Cl. 338—69 10 Claims

1. A pitch determining element for an electronic musical instrument, comprising an insulating base member, a resistance element rigidly supported on said base member, and a flexible electrically conductive member supported by said base member in close spaced, generally parallel relation to

said resistance element, said resistance element comprising a supporting rod and a helix of resistance wire wound about and



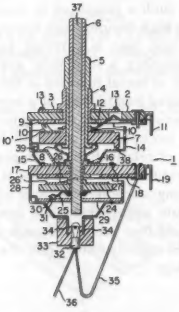
supported on said supporting rod, adjacent convolutions of said helix being insulated from each other.

3,997,864

VARIABLE RESISTOR

Shunzo Oka, Hirakata, and Kazuo Oshima, Osaka, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Japan

Filed May 31, 1974, Ser. No. 475,055
Int. Cl.² H01C *10/30*
U.S. Cl. 338—119 **15 Claims**



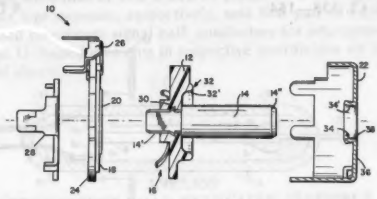
1. In a variable resistor assembly of the type having an outer rotatable control shaft, an inner control shaft extending coaxially through said outer shaft and rotatable therein, a variable resistor, and means mechanically coupled to one of said shafts for varying the resistance of said variable resistor with rotation of said shaft; the improvement comprising a click mechanism coupled to the other said shaft, and means frictionally intercoupling said inner and outer shafts whereby each shaft rotates in unison with the other when only a single shaft is rotated and each shaft may be separately rotated while restraining the other, said click mechanism comprising a click spring mounted for rotation with said other shaft, a click plate affixed to said resistor assembly whereby said other shaft is rotatable with respect to said click plate, and a click engaging means mounted on said click spring and positioned to engage said click plate, said click plate having means responsive to movement of said click engaging means to a determined angular position to provide an audible indication.

3,997,865

ROTOR AND SHAFT BEARING MEANS FOR VARIABLE RESISTANCE CONTROL

Lee R George, Frankfort, Ind., assignor to P. R. Mallory & Co., Inc., Indianapolis, Ind.

Filed July 17, 1975, Ser. No. 596,968
Int. Cl.² H01C *10/34*
U.S. Cl. 338—174 **4 Claims**



1. In a variable resistance control having a cup shaped member and a base member closing same to provide a housing and wherein an electrical contact means rotates within said housing and electrically bridges a resistance element and a collector carried in said housing, the improvement comprising:

a. a first bearing surface extending from a base of said cup shaped member,

b. a rotatable shaft extending through an aperture in said base member and engaging said first bearing surface, and

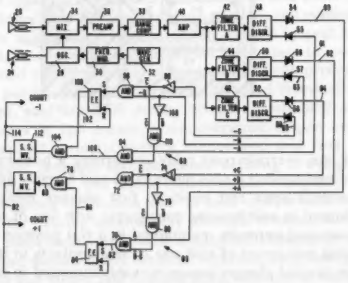
c. a rotor fixedly connected to said shaft and carrying said electrical contact means, said rotor including a second bearing surface extending around at least a portion thereof and engaging said base of said cup shaped member.

3,997,866

ACOUSTIC BUS PASSENGER COUNTER

William R. Taylor, Olney; Francis X. Linder, Landover, both of Md., and Robert V. Clark, Washington, D.C., assignors to Automation Industries, Inc., Silver Spring, Md.

Filed Mar. 31, 1975, Ser. No. 563,871
Int. Cl.² G01S *9/66*
U.S. Cl. 340—1 R **11 Claims**



1. An automatic passenger counter for vehicles, comprising:

acoustic transmitter means including a frequency modulated oscillator and a first transducer, said transducer converting the output of said oscillator to acoustic waves for transmission;

acoustic receiver means for receiving acoustic waves returned from passengers entering and leaving the vehicle, said receiver means including a second transducer responsive to acoustic waves to produce corresponding

output signals, and mixer means responsive to said second transducer output to produce range signals having frequencies proportional to the distances of targets from which transmitted acoustic signals are reflected to said receiver transducer;

limiting means restricting the response of said receiver to signals returned from defined range zones through which passengers enter and leave the vehicle, said limiting means including a zone filter for each range zone, each zone filter passing only those range signals which are reflected from targets in its corresponding zone;

circuit means responsive to each zone filter for converting range signals passing through the corresponding filter to output pulses having amplitudes proportional to the speed of motion of the target corresponding to the received range signal and having a polarity dependant on the direction of such motion; and

logic means responsive to the sequence of said pulses to produce an enter or an exit count signal corresponding to each passenger entering or leaving said vehicle.

3,997,867

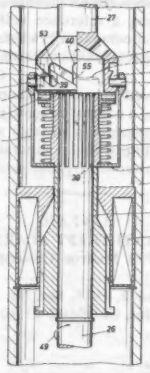
WELL BORE DATA-TRANSMISSION APPARATUS

Jackson R. Claycomb, Houston, Tex., assignor to Schlumberger Technology Corporation, New York, N.Y.

Filed Sept. 17, 1973, Ser. No. 398,290

Int. Cl.² G01V 1/40

U.S. Cl. 340—18 NC **16 Claims**



1. Apparatus adapted for measuring at least one downhole condition while drilling a borehole and comprising:

a body tandemly coupled in a tubular drill string having a borehole-drilling device dependently coupled thereto and defining a fluid passage for circulating drilling fluids between the surface and said borehole-drilling device;

data-signaling means on said body and adapted for producing digital data signals representative of at least one downhole condition;

acoustic-signaling means on said body and including a flow-directing member disposed in said fluid passage and having a plurality of spaced openings cooperatively arranged for directing drilling fluids in selected fluid paths along said fluid passage, a rotatable flow-obstructing member in said fluid passage and having a plurality of alternately-distributed angularly-spaced openings and obstructions cooperatively arranged to successively cross said fluid paths upon rotation of said flow-obstructing member for producing cyclic acoustic signals in drilling fluids flowing through said fluid passage, and motor means adapted for rotating said signal-producing member; and

coupling means co-rotatively intercoupling said motor means to said signal-producing member and operable in response to said digital signals for selectively shifting said signal-producing member between selected angular orientations during the continued rotation thereof to vary the phase of said acoustic signals in accordance with said digital signals, said coupling means including first and second rotatable shafts coaxially journalled on said body and respectively coupled to said motor means and said signal-producing member, first means on one of said shafts providing a continuous alternating track extending therearound and having a plurality of generally-longitudinal track portions which are angularly spaced around said one shaft for respectively defining said selected angular orientations of said signal-producing member and a plurality of generally-inclined track portions which are respectively spaced around said one shaft between said generally-longitudinal track portions for interconnecting the upper end of that generally-longitudinal track portion on one side of that generally-inclined track portion to the lower end of that generally-longitudinal track portion on the other side of that generally-inclined track portion, second means on the other one of said shafts including a cam member slidably mounted on said other shaft and adapted for movement along said alternating track to position said signal-producing member in its said angular orientations, and means co-rotatively coupling said cam member to said other shaft for reciprocating movement therealong between an upper position where said cam member is aligned with said upper ends of said generally-longitudinal trck portions and a lower position where said cam member is aligned with said lower ends of said generally-longitudinal track portions, stop means cooperatively arranged at the junctions of said generally-longitudinal track portions and said generally-inclined track portions for preventing the return of said cam member into whichever one of said track portions said cam member has just left until said cam member has moved completely around said one shaft, biasing means normally urging said cam member into one of its said upper and lower positions where rotation of said first shaft will keep said cam member from leaving that one of said generally-longitudinal track portions it is then disposed within for selectively maintaining said signal-producing member in its selected angular orientation corresponding to that one of said generally-longitudinal track portions, and cam-actuating means operable in response to said digital signals for selectively moving said cam member to the other of its said upper and lower positions where rotation of said first shaft will carry said cam member out of that one of said generally-longitudinal track portions it is then disposed within and into the adjacent one of said generally-inclined track portions to the next-adjacent one of said generally-longitudinal track portions to selectively shift said signal-producing member to another one of its selected angular orientations.

3,997,868

EMERGENCY VEHICLE WARNING SYSTEM

Gerson D. Ribnick, 606 N. Larchmont Blvd., Los Angeles, Calif. 90004, and Steven M. Gorenbein, 47 Alhambra Circle, No. 2, Coral Gables, Fla. 33134

Continuation-in-part of Ser. No. 334,159, Feb. 20, 1973, abandoned. This application Jan. 13, 1975, Ser. No. 540,723

Int. Cl.² G08G 1/16

U.S. Cl. 340—33 **3 Claims**

1. A vehicle signaling arrangement comprising, in combination:

radio frequency signal generating means mounted in emergency vehicles for generating a radio frequency signal having a preselected frequency, and comprising:

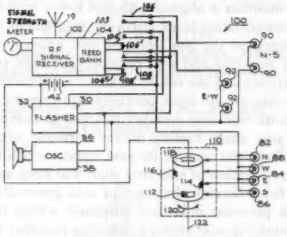
a radio frequency signal transmitting means for transmitting said radio frequency signal; a plurality of tone generating means coupled to said radio frequency signal transmitting means, and the number of said tone

generating means comprises two, and each of said plurality of tone generating means generating a tone signal having a preselected tone frequency and each of said tone frequencies different from each other, and said radio frequency signal selectively carrying each of said tone signals:

a compass switch means comprising:

a plurality of selectively operable connecting means such responsive to different orientations of said emergency vehicles with respect to the earth's magnetic field, and each of said plurality of selectively operable connecting means coupled to one of said tone generating means for selectively controlling the generation of said tone signal thereby;

a first of said plurality of selectively operable connecting means controlling a first of said tone generating means for the condition of said orientation of the emergency vehicles within a preselected number of compass degrees of a North-South axis, and a second of said plurality of selectively operable connecting means controlling the second of said tone generating means for the condition of said orientation of the emergency vehicles within a predetermined number of compass degrees of the East-West axis;



antenna means coupled to said radio frequency transmitter means for transmitting said radio frequency signal to regions external said emergency vehicles;

radio frequency signal receiver means mounted in other vehicles for receiving said radio frequency signal generated by said radio frequency signal generating means, and comprising:

a radio frequency signal receiver;

a tone signal detection means coupled to said radio frequency signal receiver for detecting said tone signal frequencies carried by said radio frequency signal, and providing a plurality of output signals in response to detection of said tone signal frequencies, each of said plurality of output signals responsive to only one tone signal;

indicator means coupled to said tone signal detection means for receiving said plurality of output signals therefrom and generating a plurality of unique detectable signals different from each other in response to each of said tone signal detection means output signals; and,

vehicle orientation indicating means mounted in said other vehicles for generating detectable signals indicating the orientation of said other vehicles relative to the earth's magnetic field.

3,997,869

SPEED LIMIT PASSING INDICATOR

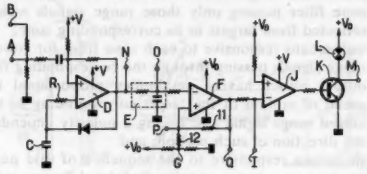
Ferdy Mayer, 18, rue Thiers, 38000 Grenoble, France

Filed May 19, 1975, Ser. No. 578,958

Claims priority, application France, May 17, 1974, 74.17240

Int. Cl.² B60Q *1/54*

U.S. Cl. 340—62 **13 Claims**



1. A speed limit passing indicating device for an automobile comprising:

means for furnishing electric pulses at a frequency proportional to the speed of the vehicle;

a frequency-voltage converter comprising a monostable multivibrator coupled to an RC low-pass filter, the monostable multivibrator having an input, said input coupled to said means for furnishing pulses;

at least one detection circuit coupled to said RC low-pass filter, said detection circuit including a comparator;

means for furnishing a reference voltage indicative of a speed limit to said comparator, whereby said comparator receives the output of said converter and said reference voltage;

a gate circuit coupled to said detection circuit;

means for supplying a control signal to said gate circuit, said control signal determining whether said gate circuit will transmit the output of said comparator; and

signaling means controlled by said gate circuit.

3,997,870

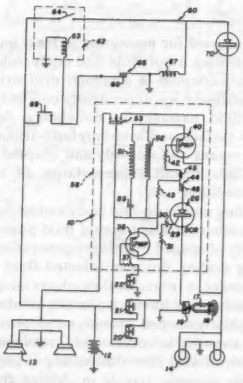
VEHICLE ANTI-THEFT ALARM SYSTEM

Paul J. Horvath, 7733 Monroe Crescent, Vancouver, B.C., Canada (V5S 3J9)

Filed June 2, 1975, Ser. No. 582,985

Int. Cl.² B60R *25/10*

U.S. Cl. 340—63 **4 Claims**



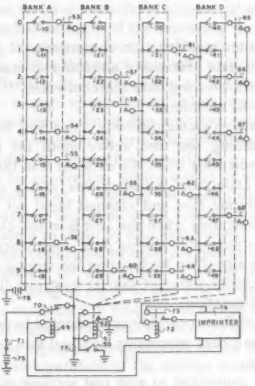
1. An anti-theft alarm system for a vehicle having a battery, a horn, headlights and a door lock operable by a key, comprising a circuit interconnecting said battery, horn and headlights

and also including a master switch operatively connected to the door lock to be closed when said lock is locked by the key, a plurality of tamper switches mounted on the vehicle and each adapted to be closed when a closure member of the vehicle is opened, a relay switch having contacts and a pair of coils adapted to close said contacts when energized, one of said pair of coils being series-connected with a condensor whereby the relay switch is alternately closed and opened to operate the horn and headlights intermittently; a rectifier connected by the circuit to the master switch, the tamper switches, and the pair of coils; a transistor connected by the circuit to the rectifier and the pair of coils, a timing switch for controlling current flow from the rectifier to the transistor, said timing switch cooperating with said transistor to limit energization of the pair of coils to a predetermined period, and a capacitor associated with the rectifier whereby said rectifier is changed from a non-conductive to a conductive state only once in response to closing of a tamper switch through preventing continued operation of the horn and headlights after the timing switch has reclosed at the end of the predetermined period when one of the tamper switches is left closed.

3,997,871
VERIFICATION SYSTEM

Ronald R. Cauley, Libertyville, and William G. Hoskins, Lake Forest, both of Ill., assignors to 1st National Bank of Libertyville, Libertyville, Ill.

Filed Oct. 24, 1975, Ser. No. 625,680
Int. Cl.² H04Q *3/02;* **H01H** *27/00*
U.S. Cl. 340—147 MD **6 Claims**



1. A verification system comprising:

a plurality of sets of switches, each said set including a plurality of switches comprising a first group of switches and a secnd group of switches;

coupling means coupling said first group of switches of each but one set of switches to all of the switches of the next succeeding set for serially coupling said sets of switches;

indicating means coupled to the first group of switches of said one set; and

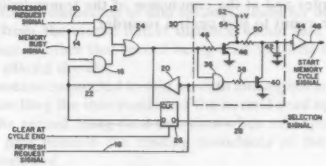
disabling means coupled to said second group of switches of each said set for disabling the system responsive to any one of said second group of switches; whereby,

when one of said first group of switches of each said set is closed, said indicating means provides a verification indication, and when any one of said second groyp of switches is closed, said disabling means disables the system indicating non-verification.

3,997,872
SYNCHRONIZER CIRCUIT

David Andrew Cane, Sudbury; David Robert Dutton, Chelmsford, and John M. Gunther, Acton, all of Mass., assignors to Digital Equipment Corporation, Maynard, Mass.

Filed July 14, 1975, Ser. No. 595,647
Int. Cl.² H04Q *5/00;* **H03K** *17/28*
U.S. Cl. 340—147 LP **15 Claims**



1. A circuit for resolving the conflict created by signals capable of occurring at essentially the same time, said circuit comprising:

A. first means for indicating the occurrence of a first signal;

B. second means for indicating the occurrence of a second signal;

C. means coupled to said first and said second means for enabling an output signal for identifying the occurrence of said first or said second signal;

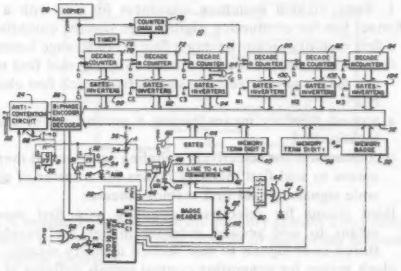
D. means coupled to said first and said second means for providing a third signal which allows sensing of said output signal; and

E. said providing means including means for selectively delaying said third signal in response to the occurrences of said second signal in relation to said first signal.

3,997,873
MULTITERMINAL MONITORING SYSTEM

Douglas R. Thornton, Maywood, Ill., assignor to Manitou Systems, Inc., Bensenville, Ill.

Filed Mar. 31, 1975, Ser. No. 563,382
Int. Cl.² G06F *7/00;* **H04Q** *9/00*
U.S. Cl. 340—149 R **11 Claims**



1. Apparatus for monitoring the use of a plurality of controlled devices comprising a plurality of terminals and a central recorder, one terminal being associated with each of said devices and each of said terminals comprising:

first means for receiving and removing user identification information;

second means for establishing a communication link between the terminal and said central recorder when user identification information is received by said first means and when user identification is removed from said first means;

third means coupled to the associated device for counting the uses of said device;

fourth means coupled to said first, second, and third means

for transmitting said user identification information to said central recorder when user identification information is received by said first means and transmitting said use count to said central recorder when said user identification information is removed from said first means; and

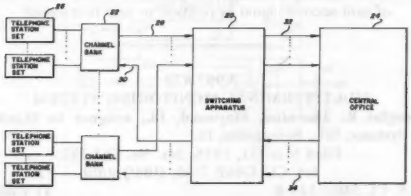
fifth means coupled to said second means for terminating the communication link between said terminal and said central recorder at the conclusion of the transmission of said user identification information to said central recorder and at the conclusion of the transmission of said use count to said central recorder.

3,997,874

TIME DIVIDED SWITCHING AND CONCENTRATION APPARATUS

Michael J. Kelly, Melrose Park; Alex W. Kobylar, Chicago, and Satyan G. Pitroda, Villa Park, all of Ill., assignors to GTE Automatic Electric Laboratories Incorporated, Northlake, Ill.

Filed Sept. 24, 1975, Ser. No. 616,474
Int. Cl.[2] H04J *3/00*; G06F *1/00*
U.S. Cl. 340—172.5 12 Claims



1. Time divided switching apparatus for use with a first channel bus for conducting digital code signals, comprising:

a first memory means having a first set of storage locations;

first means adapted for selectively coupling said first memory means to receive code signals from such first channel bus;

a second memory means having a second set of storage locations;

second means for selectively coupling said second memory means to said first memory means for transfer of stored code signals to said first memory means;

third means for selectively coupling said first memory means to said second memory means for transfer of stored code signals to said second memory means;

clock means for generating control signals defining at least two phases of operation of said apparatus and for generating sequential address signals, said first memory means being responsive to said sequential address signals during a first of said phases and said second memory means being responsive to said sequential address signals during a second of said phases;

means for storing address codes; and

means responsive to said means for storing address codes for generating additional address signals for controlling said first memory means during said second phase and for controlling said second memory means during said first phase;

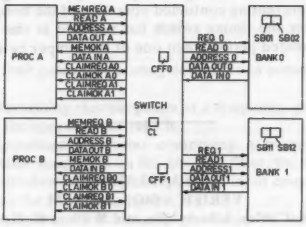
said first, second, and third means being individually coupled to said clock means to be responsive to predetermined ones of said control signals.

3,997,875

COMPUTER CONFIGURATION WITH CLAIM CYCLES

Johan Cornelis Broeren, Beekbergen, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 420,267, Nov. 29, 1973. This application June 23, 1975, Ser. No. 589,338
Claims priority, application Netherlands, Jan. 8, 1973, 7300218
Int. Cl.[2] G06F *13/00*
U.S. Cl. 340—172.5 1 Claim



1. A computer configuration comprising:

at least two data processing units and at least one further unit for transferring data therebetween;

a switch unit, including

a bistable status element having a rest and an active state, corresponding rest and active input set lines, and an output indicating when the element is in the active state,

a bistable claim unit having a free and a claimed state, corresponding free and claimed input set lines, and an output indicating when the unit is in the claimed state;

at least two stores for storing data, each store including at least one signalling bit location for storing an indication of the activity status of said at least one further unit of said configuration;

a plurality of first control lines connected between said first and second data processing unit and said switching unit, including

a first line connected to said rest set line of said bistable status element for carrying read commands,

a second line connected to the active set line of said bistable status element for carrying write commands,

a third line connected to said claim input set line of said bistable claim unit for setting said claim unit to said claimed state prior to a first of said read commands,

a fourth line connected to said free input set line of said bistable claim unit for setting said claim unit to said free position after a first of said write commands; wherein

said output of said bistable claim unit is connected to at least one of said processing units for blocking said first read command and said first write command, and

said output of said bistable status element is connected to said at least one of said processing units for blocking said read/write commands to predetermined storage locations in a selected one of said stores when the activity status of the further units is busy.

3,997,876

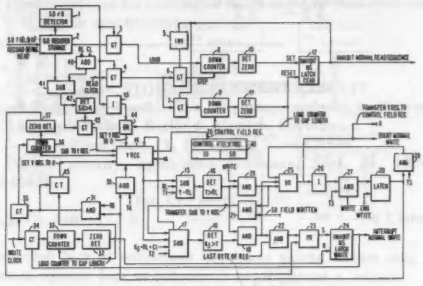
APPARATUS AND METHOD FOR AVOIDING DEFECTS IN THE RECORDING MEDIUM WITHIN A PERIPHERAL STORAGE SYSTEM

Donald Irwin Frush, Los Gatos, Calif., assignor to International Business Machines Corporation, Armonk, N.Y.

Continuation of Ser. No. 395,473, Sept. 10, 1973, abandoned, which is a continuation-in-part of Ser. No. 260,684, June 7, 1972, abandoned. This application May 6, 1975, Ser. No. 596,321

Int. Cl.² G06F 7/22, 11/00

U.S. Cl. 340—172.5 **9 Claims**



1. Apparatus for avoiding a defect in a data track on the recording media in a storage system, the recording media having an actual recording length L and a permissible data recording length of L-3, wherein B is a dedicated special gap, the recording media having been initialized prior to use with this apparatus to have recorded thereon, in a recognizable position in each data track of the recording media, a control field defining the distance from a reference point on the recording media within that track to an end point, where the end point has a fixed spatial relationship to the defect affecting that track, the storage system having at least one transducer in operable transducing relationship with the recording media for recording information on or reading information from the recording media, the apparatus comprising:

first means for generating, during a read or write operation for a record R(n), a value of the defect distance for the next sequential record R(n+1), said second means' output providing as input to said first means;

second means connected to said first means for storing the defect distance for record R(n+1), said second means' output providing as input to said first means;

third means connected to said second means for generating an output signal when record R(n+1) is affected by a defect, said signal being generated at the beginning of a normal write operation of the storage system for recording record R(+1);

fourth means connected to said second means for controlling the transfer of the defect distance stored in said second means for recording the defect distance into the control field of record R(n+1) during the writing of the control field for record R(n+1) on the recording media by the storage system;

fifth means connected to said second and said third means for controlling the interruption of the normal write operation of record R(n+1) and for the placement of a special gap onto the storage media during the interrupt period, said fifth means interrupting the normal write operation at an avoidance point with respect to record R(n+1) for preventing the defect from affecting the data being recorded with respect to record R(n+1) by placing the special gap about the defect on the recording media, the size of said special gap being greater than the maximum size of an allowable defect to be avoided by this apparatus and less than the distance B;

sixth means responsive to the completion of the placement of the special gap for returning control to the storage system for continuation of the normal write operation for the completion of the recording of record R(n+1);

seventh means for storing the defect distance recorded in a controlled field of each record when a record is read during a read operation, the output of said seventh means serving as an input to said first means during a read operation;

eight means connected to said seventh means for determining from the stored defect distance within said seventh means whether that record being read contains a special gap placed therein;

ninth means connected to said seventh and eighth means for controlling the interruption of the normal read operation of the record being read at a time when said special gap will pass beneath the reading transducer of the storage system; and

tenth means responsive to the end of the special gap passing beneath the transducer of the storage system for returning control to the storage system for continuing the normal read operation for completing the reading of said record.

3,997,877

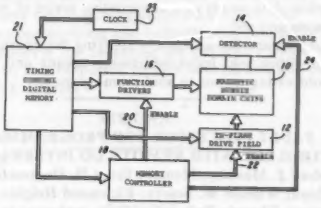
TIMING CONTROL MEANS FOR A MAGNETIC DOMAIN MEMORY

Rex Alan Naden, Richardson, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Mar. 3, 1975, Ser. No. 554,892

Int. Cl.² G11C 11/02

U.S. Cl. 340—172.5 **11 Claims**



1. A magnetic bubble domain memory system comprising:

a body of magnetic material capable of supporting magnetic bubble domains;

means coupled to said body for generating and controllably positioning magnetic bubble domains in said magnetic material in step fashion;

means coupled to said body for detecting magnetic bubble domains in said magnetic material; and

timing control means coupled to said body to regulate said generating and controllably positioning means and said detector means via timing control information for controlling the operational functioning of said system, said timing control means including a timing source comprising a digital data memory having a plurality of output lines operationally connected into said system for generating respective time control signals through said plurality of output lines in providing the timing control information enabling operation of said magnetic bubble domain memory system.

3,997,878

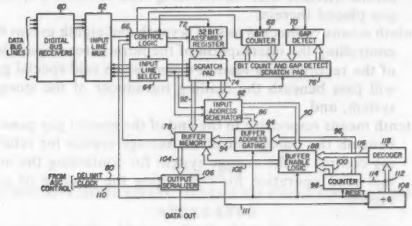
SERIAL DATA MULTIPLEXING APPARATUS

Robert J. Hirvela, Cedar Rapids, and Robert A. Bolin, Marion, both of Iowa, assignors to Rockwell International Corporation, El Segundo, Calif.

Division of Ser. No. 383,237, July 27, 1973, Pat. No. 3,891,971, which is a continuation of Ser. No. 197,905, Nov. 11, 1971, abandoned. This application Jan. 23, 1975, Ser. No. 543,385

Int. Cl.² G06F *7/10*

U.S. Cl. 340—172.5 **3 Claims**



1. Apparatus for storing complete data words in parallel and for outputting said complete data words in a consecutive series of parallel portions comprising, in combination:

a buffer memory means comprising a plurality of predefined bit length word portion storage means wherein a constant and predetermined number of said plurality is utilized to store a complete data word;

data word supplying means;

input addressing means for simultaneously and selectively energizing the predetermined number of said plurality of word portion storage means and storing, in said buffer memory means, a complete data word supplied in parallel by said data supplying means;

output addressing means for energizing individual word portion storage means for supplying parallel outputs of a word portion of the complete data word said output addressing means including means for outputting complete data words as a consecutive series of parallel word portions; and

gating means for selectively applying the energizing signals of either said input addressing means and said output addressing means to said memory means.

3,997,879

FAULT PROCESSOR FOR PROGRAMMABLE CONTROLLER WITH REMOTE I/O INTERFACE RACKS

Theodore J. Markley, Mentor; Ernst H. Dummermuth, Chesterland; William W. Searcy, Richmond Heights, and Odo J. Struger, Chagrin Falls, all of Ohio, assignors to Allen-Bradley Company, Milwaukee, Wis.

Filed Dec. 24, 1975, Ser. No. 644,074

Int. Cl.² G06F *9/06*, *11/00*, *15/46*

U.S. Cl. 340—172.5 **13 Claims**

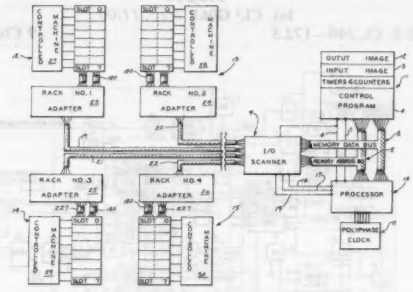
1. In an industrial digital control system having a centrally located processor means, a remotely located interface rack which connects to a controlled machine to operate devices thereon in response to received digital data bytes and to generate digital data bytes which correspond to the status of sensing devices on the controlled machine, and means for cyclically coupling a series of digital data bytes between the processor means and interface rack, the improvement therein of a fault processor which comprises:

means for detecting the occurrence of a transmission error associated with the coupling of a byte of digital data between said remote interface rack and said processor means;

storage means connected to said detecting means for storing a selected logic state when a transmission error is detected with respect to the coupling of a byte of data;

data gate means connected between said interface rack and said processor means and connected to said detecting means, said data gate means being responsive to a detected transmission error to decouple the byte of digital data associated with the detected transmission error such that it has no effect on the operation of the industrial digital control system;

means for decontrolling the controlled machine when a fault is indicated; and



gate means having one input connected to said detecting means, a second input connected to said storage means and an output connected to said decontrolling means, said gate means being operable to indicate a fault to said decontrolling means when a plurality of successive transmission errors are detected with respect to one of said bytes in said series of digital data bytes.

3,997,880

APPARATUS AND MACHINE IMPLEMENTABLE METHOD FOR THE DYNAMIC REARRANGEMENT OF PLURAL BIT EQUAL-LENGTH RECORDS

Tien Chi Chen, San Jose, and Chin Tung, Saratoga, both of Calif., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Mar. 7, 1975, Ser. No. 556,377

Int. Cl.² G11C *11/14*, *19/00*

U.S. Cl. 340—172.5 **10 Claims**

1. In an apparatus for rearranging N identifiable **2m** bit equal fixed length records $\{R_i\}$, said apparatus including an externally controllable permutation network; and information handling means adapted to be responsive to the records in the order of their arrival for loading the records into the network; for developing and applying control signals to the network so as to effectuate the physical rearrangement of the records, said signals being derived from comparisons of record identification indicia according to a predetermined algorithm; and for unloading the network; wherein the improved permutation network comprises: loop having a latency of 2m bit times;

N selectively operable dual mode switches S_0 to S_{N-1}, the switches being connected to the loops so as to form a linked linear ladder structure; switch S_{N-1} for loop L_{N-1}, or switches S_i and S_{i+1} bounding any given loop L_i other than L_{N-1}, upon being set into the first mode by a control signal maintains the given loop as a circulating path; furthermore, any switch S_i between any given pair of adjacent loops L_{i-1} and L_i upon being set into the second mode by a control signal, provides a unidirection cross-over path connection between the adjacent loops L_{i-1} and L_i; loop L_0 communicating with an input/output port; the loops and switches being lexically ordered in increasing sequence from 0 through N−1.

clocking means for causing all loops to move their contents, if any, in synchronism.

3,997,881
STATIC STORAGE ELEMENT CIRCUIT

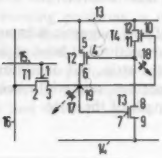
Kurt Hoffmann, Taufkirchen, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Sept. 11, 1975, Ser. No. 612,554

Claims priority, application Germany, Sept. 26, 1974, 2446028

Int. Cl.² G11C *11/40*

U.S. Cl. 340—173 R **6 Claims**



1. A static storage element circuit comprising:

a. first, second, third and fourth field effect transistors (FETs) each having a gate terminal and a drain-source channel with first and second channel terminals, said first and third FETs having a first conductivity type channel and said second and fourth FETs being of opposite conductivity to the first and third FET channels,

i. the first channel terminal of the first FET being connected to the first channel terminal of the second FET, to the gate terminal of the third FET, and to the gate terminal of the fourth FET,

ii. the gate terminal of the second FET being connected to the first channel terminal of the fourth FET, and

iii. the first channel terminal of the fourth FET being connected to the second channel terminal of the third FET;

b. a word line connected to the gate terminal of the first FET; and

c. a bit line connected to the second channel terminal of the first FET.

3,997,882
CONTENT ADDRESSABLE MEMORY SYSTEM EMPLOYING CHARGE COUPLED DEVICE STORAGE AND DIRECTORY REGISTERS AND N/(1-H) COUNTER REFRESH SYNCHRONIZATION

Deepak K. Goyal, Princeton, N.J., assignor to Burroughs Corporation, Detroit, Mich.

Filed Apr. 1, 1975, Ser. No. 564,140

Int. Cl.² G11C *15/00*

U.S. Cl. 340—173 AM **24 Claims**

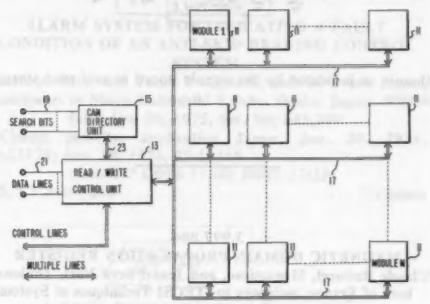
1. A content addressable memory system for accessing data in response to an inputted tag word and read, write and search tag signals comprising:

a plurality of memory modules, each said module containing a plurality of blocks of data storage means;

a plurality of closed loop charge storage shift register means for storing in succession and accessing in succession in response to a said search tag signal a plurality of directory words, each said directory word comprising a plurality of bit positions said bit positions grouped to form a tag syllable, a module address and a block address, each said shift register means being arranged to shift circularly and in parallel with the other said shift registers, each said register storing a particular bit position of each of said directory words;

means for clocking said shift registers,

input-output means at a parallel bit storage position of each of said shift registers for enabling accessing each of said directory words in parallel as said directory words are



successively shifted to said parallel bit storage position in response to clocking of said shift registers by said clock means;

means for comparing each said tag word syllable to said inputted tag word when said tag syllable is presented at said parallel bit storage position and for detecting a match between a said tag word syllable and said inputted tag word;

means for outputting from said input-output means the block address and module address of a directory word containing said matching tag word syllable; and

control means receiving said outputted module address and block address for accessing the particular block represented by said outputted module address and said outputted block address.

3,997,883
LSI RANDOM ACCESS MEMORY SYSTEM

William Y. Wong, Torrance, and Jaw J. Hsieh, Los Angeles, both of Calif., assignors to The National Cash Register Company, Dayton, Ohio

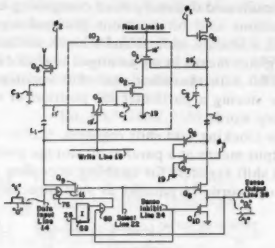
Filed Oct. 8, 1968, Ser. No. 765,795

Int. Cl.² G11C *11/24, 11/34*; H03K *3/26*

U.S. Cl. 340—173 R **31 Claims**

1. An LSI memory array comprising: a plurality of memory cells arranged in rows and columns, each of the memory cells having means for capacitively storing a binary digit by the presence or absence of a stored charge therein; means for selecting a row of memory cells and supplying a read signal to the memory cells of the selected row to produce signals indicating which memory cells in the row are storing a charge therein; respective read storage means provided for respective columns of the memory array for storing the signals produced by the read signal supplied to the memory cells of the selected row; means for selecting a column of memory cells and reading from the memory array the stored signal in said read storage means associated with the memory cell of the selected

column; and refresh means for refreshing those memory cells common to the selected row and having a stored charge



therein as indicated by the signals stored in said read storage means.

3,997,884

MAGNETIC DOMAIN PROPAGATION REGISTER

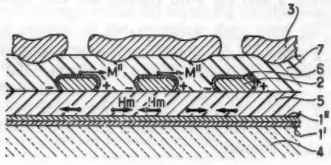
Claude Battarel, Magagnosc, and Jean-Pierre Nori, Toulouse, both of France, assignors to (TECSI Techniques et Systemes Informatiques), Paris, France

Filed Feb. 25, 1975, Ser. No. 552,820

Claims priority, application France, Mar. 8, 1974, 74.08012

Int. Cl.² G11C *19/00, 11/14*

U.S. Cl. 340—174 ZB **7 Claims**



1. In a register for propagating magnetic domains in a zone formed by a magnetic layer having uniaxial anisotropy with slight coercivity, or soft zone, surrounded by a zone having greater coercivity, or hard zone, that register being of the type forming several parallel segments each of which comprises a central zone and, on each side a lateral zone having divisions with edges which are alternately straight and inclined in relation to the axis of the central zone and comprising, in a functional combination:

a lateral conductor, in sinuous configuration having several legs each of which covers alternately at least the divisions on one side and at least the divisions of the other side of the central zone and ensuring simultaneously the growth of the domains beneath one leg and the deleting of the domains beneath the adjacent leg;

a central conductor, in a sinuous configuration, having a width approximately equivalent to the space between two legs of the lateral conductor, for example greater or smaller by 0 to 40%, in which every other leg covers a central part of at least one segment, said central conductor ensuring the transfer of the domains from the divisions which are beneath one leg of the lateral conductor to the divisions which are beneath the adjacent leg,

the improvement comprising: a hard extra magnetic layer arranged in strips parallel to the difficult magnetization axis of the soft zone at a given distance from the latter.

3,997,885

REGISTER FOR THE PROPAGATION OF MAGNETIC DOMAINS IN THIN MAGNETIC LAYERS

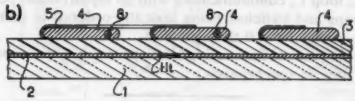
Claude Battarel, Magagnosc, France, assignor to (TECSI Techniques et Systemes Informatiques), Paris, France

Filed Mar. 7, 1975, Ser. No. 556,523

Claims priority, application France, Mar. 8, 1974, 74.08011

Int. Cl.² G11C *19/00, 11/14*

U.S. Cl. 340—174 ZB **8 Claims**



1. A magnetic thin film shift register of the type in which magnetic domains are propagated, under the effect of electric currents, along a channel formed by a first strip of soft anisotropic magnetic material deposited on an insulating substrate, said register comprising:

a. a sinuous shift conductor extending along the length of the strip and having vertical sections perpendicular to the length of the strip and repeatedly crossing over the strip;

b. an insulating layer between the strip and said shift conductor; and

c. a first layer of soft magnetic substance overlying each of said conductor sections at least at the point of cross-over thereof with the strip, but overlying less than the entire width of the section, said width being in the same direction as the length of the strip.

3,997,886

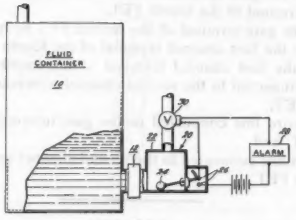
LIQUID CONTAMINATION DETECTOR

Julius Lerner, Broomall, Pa., assignor to Sun Oil Company of Pennsylvania, Philadelphia, Pa.

Filed Sept. 26, 1975, Ser. No. 616,985

Int. Cl.² G08B *21/00*; B03C *1/30*; H01H *35/00*

U.S. Cl. 340—236 **2 Claims**



1. A system for detecting the presence of contaminating fluids while discriminating against the presence of other, normal fluids and comprising:

a. means for holding a supply of fluids;

b. a barrier means in said holding means and having one side in contact with the supply of fluids, said barrier means including a ferromagnetic fluid diaphragm wherein the base fluid of the ferromagnetic fluid is soluble by said contaminating fluids and is insoluble by other, normal fluids in said holding means; and

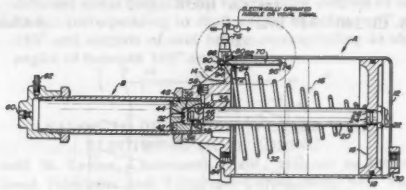
c. means, positioned on the other side of said barrier means, for detecting the presence of a fluid which has dissolved and penetrated said barrier means.

3,997,887

PISTON OVERTRAVEL INDICATOR

Kay S. Poynter, Owosso, Mich., assignor to Midland-Ross Corporation, Cleveland, Ohio

Filed June 27, 1975, Ser. No. 591,050
Int. Cl.² G08B 21/00; B60Q 1/26; H01H 35/38
U.S. Cl. 340—242 9 Claims



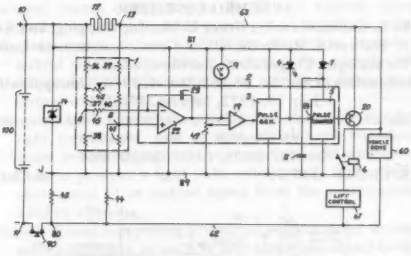
8. In a pressure converter for converting and intensifying pneumatic pressure to hydraulic pressure and including a pneumatic piston movable in a cylinder and connected by a rod with a smaller hydraulic piston, said pneumatic piston being movable from a rest position to normal working positions, indicator means including a first electrically operated signal and a second visual signal for respectively indicating overtravel and degree of overtravel of said pneumatic piston beyond said normal working positions, a movable indicator member for operating said first and second signals, said pneumatic piston being engageable with said indicator member only upon movement of said pneumatic piston beyond said normal working positions for moving said indicator member and placing said first and second signals in their operated positions.

3,997,888

CHARGE MONITOR FOR ELECTRIC BATTERY

Manfred Kremer, Hamburg, Germany, assignor to Still GmbH (vormals SE-Fahrzeugwerke GmbH), Hamburg, Germany

Filed Oct. 2, 1975, Ser. No. 618,922
Claims priority, application Germany, Oct. 2, 1974, 2446958
Int. Cl.² G08B 21/00
U.S. Cl. 340—249 19 Claims



1. A charge monitor for an electric battery provided with a first and a second terminal and with a load circuit connected across said terminals, comprising:

a voltage divider with a voltage-stabilized first section and a resistive second section serially connected across said terminals, said first section extending between said first terminal and a juction point, said second section extending between said junction point and said second terminal;

a resistive bridge circuit connected between said first terminal and said junction point, said bridge circuit having an output diagonal with a corner tied to said second terminal via a resistive connection for tending to unbalance said bridge circuit in one sense upon a decrease in the potential difference between said terminals;

current-sensing means coupling said bridge circuit with said load circuit for tending to unbalance said bridge circuit in an opposite sense upon an increase in current flow through said load circuit;

amplifier means differentially connected across said output diagonal for generating a test voltage representative of the state of charge of said battery; and

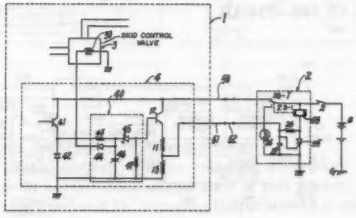
dectector means connected to said amplifier means for establishing an alarm condition upon said test voltage passing from a normal range to an off-normal range indicative of a predetermined state of depletion of said battery.

3,997,889

ALARM SYSTEM FOR INDICATING A FAULT CONDITION OF AN ANTI-SKID BRAKING CONTROL SYSTEM

Takefumi Sato, and Tatuo Yokoyama, both of Tenri, Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Jan. 29, 1975, Ser. No. 545,209
Claims priority, application Japan, Jan. 30, 1974, 49-13170; Jan. 30, 1974, 49-13169
Int. Cl.² G08B 21/00; B60T 17/22
U.S. Cl. 340—256 7 Claims



1. In an alarm system for indicating a fault condition of an anti-skid braking control system wherein a fault detection unit which is activated only upon detection of a fault in the anti-skid braking control system and a fault indication unit are spaced away from each other, said system also having a fault detection signal transmission wire connecting the fault detection unit to the fault indication unit and which carries current from said fault detection unit to said fault indication unit only when the former unit is in an activated state, said system further having a power supply wire connecting the fault indication unit to the fault detection unit, the improvement comprising:

a fault indication driving circuit provided within the fault indication unit which is so connected that normally it is in a blocked condition permitting no current flow therethrough; and

a bias voltage generating means for biasing the fault indication driving circuit into a conducting state when a break occurs in the power supply wire or the signal transmission wire, thereby permitting current flow through the driving circuit and consequent activation of the fault indication unit.

3,997,890

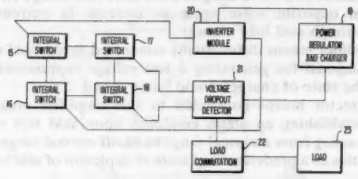
ALARM SYSTEM WITH SUPERVISORY SYSTEM TO DETECT SEVERING OR BRIDGING OF DETECTION SWITCHES

Embry Mayes Kendrick, Jr., 1165 N. Coleman Road, Roswell, Ga. 30075

Filed June 11, 1974, Ser. No. 478,422
Int. Cl.² G08B 13/00
U.S. Cl. 340—285 19 Claims

1. A tamper resistant detector circuit for use in an alarm

system comprising a bridge having four arms, each arm being comprised of a switch means for changing state in response to



an alarm condition, and a diode electrically connected to said switch, an AC voltage being applied across one diagonal of said bridge.

3,997,891

LIGHT PEN DETECTION SYSTEM

Masahiro Iwamura; Nagaharu Hamada, and Yukitaka Hayashi, all of Hitachi, Japan, assignors to Hitachi, Ltd., Japan

Filed June 3, 1975, Ser. No. 583,408
Claims priority, application Japan, June 5, 1974, 49-62895
Int. Cl.² G06K *15/20*
U.S. Cl. 340—324 AD **10 Claims**

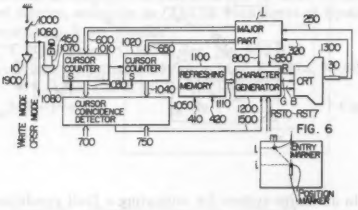


FIG. 6

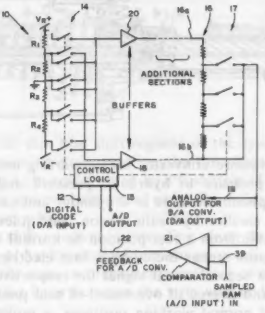
1. A light pen detection system for use in a display system of the raster scan type having a memory for storing the information to be displayed and for reading out that information in synchronism with the raster scanning of the cathode ray tube, a character generator producing the video signal in response to the output of the memory, and a display portion for receiving the video signal and for displaying the information comprising: a light pen for detecting a character display position on the face of the cathode ray tube; a circuit for synchronizing a signal representing the beginning of the light pen detection operation with the raster scanning of picture; a circuit for generating a clock gate signal which is set by a signal produced when said synchronized signal representing the beginning of the light pen detection operation appears together with the leading edge of the vertical synchronizing signal of the cathode ray tube and is reset by a signal detected by the light pen produced when the electron beam has passed the character display position on the cathode tube screen indicated by the light pen; a pulse generator circuit for generating clock pulse once each period for which the electron beam scans one character display position on the cathode ray tube screen; horizontal and vertical address counters for counting said clock pulses for the period said clock gate signal lasts; a latch register for latching the contents in these address counters each frame operation; a coincidence detector for producing a signal when the contents of the latch register coincides with the horizontal and vertical synchronizing signals; and a position marker generator which receives said output signal of the coincidence detector and produces video signals for displaying the position marker, whereby the position marker is displayed on the position of the cathode ray tube screen indicated by the light pen.

3,997,892

DIGITAL TO ANALOG CONVERTER WITH IMPROVED COMPANDING

Dieter A. Susset, San Mateo, Calif., assignor to TRW Inc., Los Angeles, Calif.

Continuation of Ser. No. 383,268, July 27, 1973, abandoned. This application Feb. 4, 1975, Ser. No. 546,867
Int. Cl.² H03K *13/02*
U.S. Cl. 340—347 DA **6 Claims**



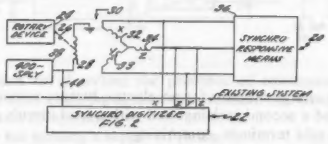
1. A digital to analog converter for converting a digital code having higer order bits and lower order bits to an analog value comprising: a first voltage divider having a plurality of resistors having values to approximate a desired transfer characteristic each of said resistors corresponding to a unique digital number representing said higher order bits; a second voltage divider having a plurality of series connected resistors of equal value; first switching means for connecting a resistor of said first voltage divider corresponding to the higher order bits across said second voltage divider; second single pole type switching means for coupling an analog output terminal to a point on said second voltage divider corresponding to said lower order bits; and decoding means responsive to said higher and lower order bits for providing control signals to said first and second switching means respectively.

3,997,893

SYNCHRO DIGITIZER

John E. Games, Granby; Henry E. Martin, Wapping, and Kirk S. Walworth, Rockville, all of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Continuation of Ser. No. 95,167, Dec. 4, 1970. This application July 10, 1972, Ser. No. 270,351
Disclosure was also published under second Trial Voluntary Protest Program on Mar. 30, 1976
Int. Cl.² H03K *13/02*; **H03D** *3/04*
U.S. Cl. 340—347 SY **6 Claims**



1. A shaft angle encoder comprising:

means including a reference voltage source, for providing differential signals together indicative of mechanical shaft angle;

circuit means connected for response to the signal outputs of said signals providing means for providing a pair of advance signals relating to an angle in advance of the shaft angle;

and RC/CR bridge responsive to said advance signals for providing output signals, the electrical phase difference of which is equal to twice the shaft angle;

means providing an output manifestation of the outputs of said bridge; and

means concurrently responsive to said bridge outputs, at least one advance signal, and to said reference voltage source, for providing an output manifestation having two different states respectively representing outputs of said bridge corresponding to shaft angles of between 0° and 180° and outputs of said bridge corresponding to shaft angles of between 180° and 360°.

3,997,894

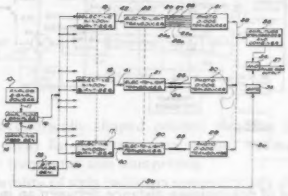
ANALOG-TO-DIGITAL CONVERTER WITH ELECTRO-OPTICAL CODING

Arnold M. Levine, Chatsworth, Calif., assignor to International Telephone and Telegraph Corporation, New York, N.Y.

Filed June 30, 1975, Ser. No. 591,287

Int. Cl.² H03K *13/02, 13/175*

U.S. Cl. 340—347 AD **10 Claims**



1. A device for converting an analog function in electrical form to a series of digital words representative of the amplitude of said analog function at corresponding successive points thereof spaced in time by a predetermined amount, comprising:

first means for sampling said analog function at said successive points to provide a corresponding succession of amplitude values;

second means comprising a plurality of window circuits each responsive to said succession of amplitude values, said window circuits each being adapted to provide an output signal only when a corresponding sample value occurs within said succession of amplitude values at the output of said first means;

third means comprising a plurality of electronic signal-to-light transducers, one of said plurality of transducers being exclusively responsive to each of said window circuits to produce a light pulse substantially at the time of occurrence of an output signal from the corresponding window circuit;

fourth means comprising a discrete optical delay arrangement responsive to each of said electronic signal-to-light tranducers, said delay arrangement corresponding to each of said electronic signal-to-light transducers including a number of at least one optical delay lines of varying lengths responsive in parallel to said light pulse generated by the corresponding transducer within said third means, to generate a denominational digital word in light pulse form serially in time representative of the amplitude value significance of the corresponding window circuit of said second means;

and fifth means responsive to the output of said optical delay lines of said fourth means to provide a succession of digital words representative of said succession of amplitude values of said analog function.

3,997,895

DATA PROCESSING SYSTEM WITH A MICROPROGRAMMED DISPATCHER FOR WORKING EITHER IN NATIVE OR NON-NATIVE MODE

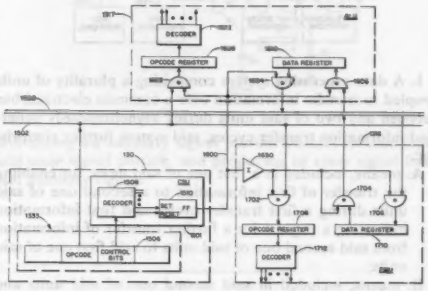
Jean-Claude Cassonnet, Conflans-Ste-Honorine, and Andre Milleret, Santeny, both of France, assignors to Compagnie Honeywell Bull (Societe Anonyme), Paris, France

Filed Dec. 2, 1974, Ser. No. 528,824

Claims priority, application France, Nov. 30, 1973, 73.42708

Int. Cl.² G06F *15/16, 9/06*

U.S. Cl. 340—172.5 **10 Claims**



1. A data processing system comprising:

A. an arithmetic logic unit for executing instructions in a native or normal mode of operation of said system;

B. an emulation unit for executing instructions in a nonnative mode of operation of said system;

C. microprogram storage means comprising a plurality of instructions, each of said instructions comprising a plurality of fields, one of which fields defines the operation to be provided by either said arithmetic logic unit or said emulation unit, and another of which fields includes a code for indicating whether said operation is to be provided by said arithmetic logic unit or said emulation unit;

D. decoder means for decoding the contents of said fields and generating control signals responsive thereto;

E. common bus means coupled between said arithmetic logic unit, said emulation unit and said microprogram storage means for transfer of data and instructions therebetween; and

F. microprogrammable switch means, including said decoder means, responsive to said control signals decoded from the contents of said another of said fields, said switch means comprising

1. means for transferring the contents of said one of said fields over said common bus means to either said arithmetic logic unit or said emulation unit,

2. means for enabling the transfer of data between either said arithmetic logic unit or said emulation unit and said common bus means,

3. first means for generating a first signal if said code in said another of said fields indicates that said arithmetic logic unit is to provide said operation,

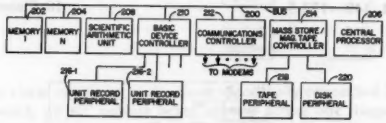
4. second means for generating a second signal if said code in said another of said fields indicates that said emulation unit is to provide said operation; and

5. register means coupled to store said first signal or said second signal generated by either said first or second means for generating.

3,997,896
DATA PROCESSING SYSTEM PROVIDING SPLIT BUS CYCLE OPERATION

Frank V. Cassarino, Jr., Weston; George J. Bekampis, Sudbury; John W. Conway, Waltham, and Richard A. Lemay, Bolton, all of Mass., assignors to Honeywell Information Systems, Inc., Waltham, Mass.

Filed June 30, 1975, Ser. No. 591,965
Int. Cl.² G06F *13/00*
U.S. Cl. 340—172.5 **16 Claims**



1. A data processing system comprising a plurality of units coupled to transfer information over a common electrical bus between any two of said units during asynchronously generated information transfer cycles, said system further comprising:

A. means, included in a first one of said units, for enabling the transfer of first information to a second one of said units during a first transfer cycle, said first information indicating a request for a further transfer of information from said second one of said units to said first one of said units;

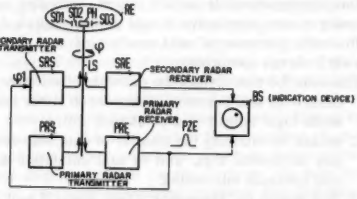
B. means, included in said second one of said units and responsive to said first information, for enabling the transfer of second information to said first one of said units during a later transfer cycle asynchronously generated at a point in time following said first cycle; and

C. means, included in each of said units, for enabling the transfer of information between any two of said units except said first and second ones of said units, during any transfer cycle generated between the time said first cycle and said later cycle are generated.

3,997,897
RADAR SYSTEM WITH DISPLACED PRIMARY AND SECONDARY RADIATION LOBES

Anton Brunner, Wangen, Starnberg, and Reinhard Bredow, Munich, both of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Oct. 23, 1974, Ser. No. 517,232
Claims priority, application Germany, Oct. 25, 1973, 2353504
Int. Cl.² G01S *9/56*
U.S. Cl. 343—6 R **11 Claims**

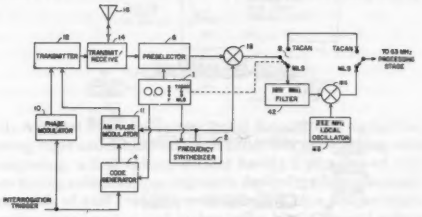


1. A radar system comprisig: a primary radar with an antenna device for generating a moving primary radiation lobe having an axis along a first line, a secondary radar with an antenna device for generating a moving secondary radiation lobe having an axis along a second different line, a primary radar receiver for receiving echo signals from a target, said echo signals being coupled to a target indicating device after a given processing time interval for producing a target indication signal, said second line being displaced from said first line in an angular direction opposed to the angular movement of the radiation lobe of said primary radar antenna device by an angle predetermined by the length of said time interval and the speed of angular movement of said antenna lobes, means coupling the echo signals to the secondary radar transmitter, thus compensating the movement of said primary radiation lobe during said given processing time interval, whereby interrogation signals triggered from said secondary radar transmitter by the echo signals of the primary radar receiver after said predetermined processing time are directly and immediately radiated to the target which generated said echo.

3,997,898
CHANNELING METHOD AND APPARATUS

Jesse S. LeGrand, Clifton, N.J., assignor to International Telephone and Telegraph Corporation, Nutley, N.J.

Filed May 5, 1975, Ser. No. 574,223
Int. Cl.² G01S *9/56*
U.S. Cl. 343—6.5 R **8 Claims**



3. A method of determining distance between an interrogator and a transponder comprising:

transmitting from an interrogator X and Y mode interrogation signals within the TACAN frequency band;

receiving said interrogation signals at a transponder;

transmitting from said transponder and in response to said interrogation signals X and Y mode phase coded reply signals in the first and fourth quarter of the TACAN frequency band;

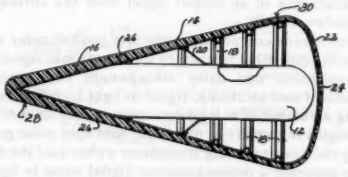
receiving said reply signals at said interrogator; and

processing said reply signals to determine distance between said interrogator and said transponder.

3,997,899
LOW RADAR CROSS-SECTION RE-ENTRY VEHICLE

Bernard Rolsma, Rochester, Mich., assignor to Chrysler Corporation, Highland Park, Mich.

Filed Mar. 20, 1961, Ser. No. 97,097
Int. Cl.² H01Q *17/00*
U.S. Cl. 343—18 A **2 Claims**



1. A low radar cross-section re-entry vehicle comprising: a tubular metallic cannister enclosing all instrumentation and payload for said vehicle, said cannister having a diameter of approximately 10 inches and an overall length of approximately 65 inches with a conical portion having an included angle of approximately 26° closing the forward end thereof

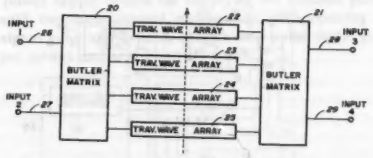
and a closure at the rear end of said cannister; and an aerodynamic fiberglass superstructure conical in form completely enclosing said cannister with the forward end of said cannister nested in the forward end of said superstructure, said superstructure having an included angle of approximately 26°, a length of approximately 67 inches and a base diameter of approximately 30 inches; said vehicle having its center of gravity closer to the pointed forward end thereof than is the center of pressure thereof.

3,997,900

FOUR BEAM PRINTED ANTENNA FOR DOPPLER APPLICATION

Edward G. H. Chin, Rego Park, N.Y., and Leonard Schwartz, Montville, N.J., assignors to The Singer Company, Little Falls, N.J.

Filed Mar. 12, 1975, Ser. No. 557,894
Int. Cl.² H04B 7/00
U.S. Cl. 343—100 SA **8 Claims**



1. A cylindrically shaped printed airborne doppler radar antenna array for generating up to four beams symmetrical about its transverse axis comprising:

a. a plurality of strip radiators symmetrically disposed about a cylindrical locus;

b. a first Butler matrix having inputs adapted to be coupled to suitable radar circuitry for scanning said strip radiators;

c. a first plurality of printed phase shifters coupled to outputs of said first Butler matrix for focusing a beam in one of a plurality of scan positions;

d. a second Butler matrix having its inputs coupled to said printed phase shifters and having its output coupled to one end of said plurality of strip radiators for acting as a mode generating matrix;

e. a third Butler matrix having inputs adapted to be coupled to said radar circuitry for scanning said strip radiators;

f. a second plurality of printed fixed phase shifters coupled to outputs of said third Butler matrix for focusing a beam in one of a plurality of scan positions; and

g. a fourth Butler matrix having its inputs coupled to said second plurality of printed fixed phase shifters and having its output coupled to the other end of said radiators for acting as a mode generating matrix, both said first and third Butler matrices having at least two inputs, whereby by selectively exciting the four inputs thereby provided, any one of four beams symmetrically disposed about the transverse axis of said antenna can be generated.

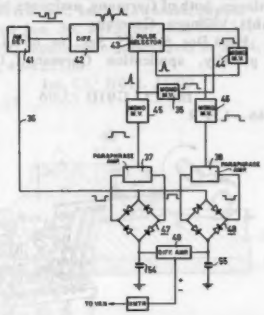
3,997,901

METHOD OF DIRECTING AN AERIAL TO A RECEIVER ACCORDING TO A MAIN DIRECTION

Jacques Claude Cayzac, La Varenne, France, assignor to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 382,399, July 25, 1973, abandoned, which is a continuation of Ser. No. 155,912, June 23, 1971, abandoned. This application Dec. 31, 1974, Ser. No. 537,691
Claims priority, application France, June 23, 1971, 71.655912
Int. Cl.² G01S 1/14
U.S. Cl. 343—100 CS **10 Claims**

7. A method comprising receiving a transmitted signal from a transmitter having a main transmission direction during an information content portion of said transmitted signal and two other directions symmetrical with respect to said main direction during an auxiliary signal portion distinct in time from said main signal portion, and producing an error signal from said auxiliary signals.

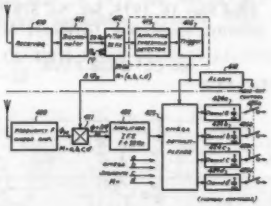


3,997,902

TRANSMISSION OF RADIO NAVIGATION PHASE CORRECTIONS

Georges Nard, Nantes, France, assignor to Societe d'Etudes, Recherches et Constructions Electroniques-SERCEL, Carquefou, France

Filed June 28, 1974, Ser. No. 484,030
Claims priority, application France, July 3, 1973, 73.24351
Int. Cl.² G01S 1/30
U.S. Cl. 343—105 R **18 Claims**



12. A correction receiver for use with a receiver of a sequential radionavigation system, comprising:

means for reception, filtering and demodulation of the signal transmitted by a radio-beacon station amplitude modulated for conventional direction finding and in phase according to a multiplexed phase-correction signal, such means providing a demodulated multiplexed correction signal,

means to apply the said correction signal to the received phase in such a way that each phase undergoes the phase correction received at the same instant,

means for separately rectifying the said multiplexed correction signal, and

means for inhibiting the application of corrections when the rectified amplitude of the multiplexed correction signal is less than a preselected value.

3,997,903
ELECTROGRAPHICAL RECORDING SYSTEM

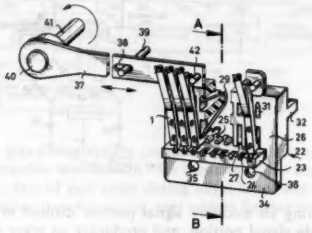
Heinz Kelch, Buchenberg, and Eduard Schuh, Villingen-Schwenningen, both of Germany, assignors to Kienzle Apparate GmbH, Villingen, Germany

Filed Dec. 5, 1975, Ser. No. 638,170

Claims priority, application Germany, Dec. 6, 1974, 2457741

Int. Cl.² G01D *15/06*

U.S. Cl. 346—139 R **15 Claims**



1. Recording system, comprising, in combination, a record carrier for receiving markings; transport means for transporting said record carrier along a predetermined path; a plurality of recording elements each comprising an electrically conductive rigid supporting member having connecting means for receiving electrical energy; an electrode spring-mounted on said supporting member; electrically insulating mounting means for pivotally mounting said recording elements side-by-side along said path and in a direction perpendicular thereto; oscillating drive means; and coupling means for coupling said oscillating drive means to said recording elements for pivoting said pivotally mounted recording elements about a pivot axis.

3,997,904
CAMERA CIRCUIT ARRANGEMENT FOR THE PRE-INDICATION OF EXPOSURE TIME

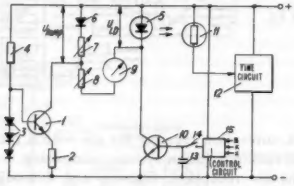
Siegfried Schutze, Dresden, and Werner Locke, Radebeul, both of Germany, assignors to VEB Pentacon Dresden, Germany

Filed May 16, 1975, Ser. No. 578,319

Claims priority, application Germany, May 30, 1974, 178860

Int. Cl.² G03B *17/18*

U.S. Cl. 354—23 R **3 Claims**



1. A circuit arrangement for the pre-indication of the exposure time to be expected in an automatic mirror-reflex camera and comprising:

a. an electronic time forming system including a photo-receiver;

b. a controllable luminous diode, the brightness of which is dependent on the expected exposure and which brightness is held constant for the duration of the exposure to illuminate the photo-receiver of said time formation circuit;

c. a measuring mechanism for measuring a voltage dropped across the luminous diode which voltage drop includes a portion dependent on the response voltage of said luminous diode;

d. a constant current source;

e. compensation means receiving the current from said constant current source and connected between said luminous diode and said measuring mechanism to provide compensation for the response voltage of said luminous diode whereby said measuring mechanism measures a voltage substantially linearly dependent on the expected exposure time.

3,997,905
PROGRAM-CONTROLLED SHUTTER

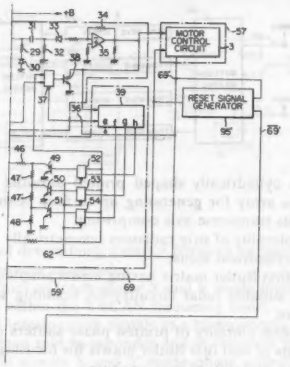
Hiroshi Iwata, Osaka, and Katsuji Ishikawa, Daito, both of Japan, assignors to West Electric Company, Ltd., Japan

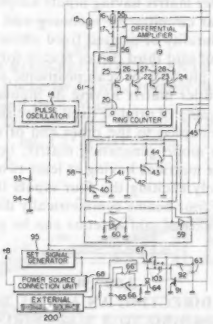
Filed Apr. 11, 1975, Ser. No. 567,231

Claims priority, application Japan, Apr. 18, 1974, 49-44101

Int. Cl.² G03B *7/08, 9/08*

U.S. Cl. 354—29 **15 Claims**





1. A program-controlled shutter comprising

a. an exposure control mechanism comprising a plurality of shutter blades which also function as the aperture control blades, and driving means which is rotated intermittently in one direction through a discrete angle in response to opening pulse signals for opening said shutter blades and is rotated intermittently in a direction opposite to said one direction through a discrete angle in response to

closing pulse signals to close said shutter blades, said driving means having sliding elements slidably contacting said shutter blades for opening and closing said shutter blades in accordance with the rotation of said driving means;

b. opening pulse signal generator means for applying the opening pulse signals the number of which is dependent upon the brightness of a subject to said driving means so that the latter causes said shutter blades to open to define a desired aperture depending upon the brightness of said subject;

c. closing pulse signal generator means for applying the closing pulse signals to said driving means after said shutter blades have been opened for a desired time interval depending upon the brightness of the subject, thereby closing said shutter blades, said closing pulse generator operating independently of the termination of pulses from said opening pulse generator;

d. control means for controlling the operations of said exposure control mechanism, said opening pulse signal generator means, and said closing pulse signal generator means; and

e. power supply means for supplying the electric power to said exposure control mechanism, said opening pulse signal generator means, said closing pulse signal generator means and said control means.

3,997,906

DIAPHRAGM DEVICE IN A CAMERA LENS

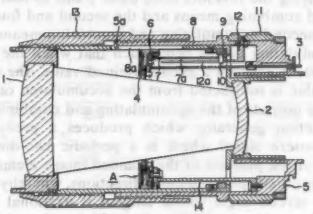
Toshio Kashiwase, Zushi, Japan, assignor to Nippon Kogaku K.K., Tokyo, Japan

Filed Aug. 14, 1975, Ser. No. 604,704

Claims priority, application Japan, Aug. 17, 1974, 49-97938[U]

Int. Cl.² G03B 9/07, 17/12

U.S. Cl. 354—196 5 Claims



1. A diaphragm device for a camera having a movable lens barrel comprising:

a diaphragm blade having its position in the direction of the optical axis fixed with respect to a mount portion for mounting a lens to the body of the camera, the diaphragm blade being stopped down when shutter release occurs in response to the shutter mechanism of the camera;

an aperture diameter setting member for presetting the rest position of the diaphragm blade when stopped down and for stopping the operation of the diaphragm blade when shutter release occurs and the blade reaches a position corresponding to the aperture preset operation; and

correcting means for changing the rest position of the diaphragm blade preset by the aperture diameter setting member in response to axial movement of the lens barrel so that the quantity of light reaching a film surface which is determined by the stopped down position of the diaphragm blade preset by the aperture diameter setting member assumes a predetermined value irrespective of the axial movement of the lens barrel.

3,997,907

LIGHT EMITTING GALLIUM PHOSPHIDE DEVICE

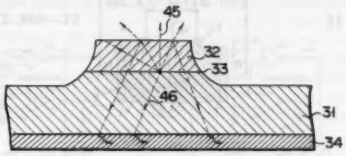
Tadao Nakamura; Tetsuo Sadamasa, both of Tokyo, and Osamu Abe, Yokohama, all of Japan, assignors to Tokyo Shibaura Electric Co., Ltd., Kawasaki, Japan

Filed Jan. 30, 1975, Ser. No. 545,347

Claims priority, application Japan, July 8, 1974, 49-77350; Oct. 23, 1974, 49-121500

Int. Cl.² H01L 33/00

U.S. Cl. 357—17 9 Claims



1. A pure-green light-emitting gallium phosphide device comprising a gallium phosphide substrate of N-conductive type doped with nitrogen, a gallium phosphide layer of P-conductive type formed on one side of said substrate so as to define a P-N junction and having at least one light-emitting region, and a light-absorbing and light-reflection-suppressing layer made of noncrystalline or polycrystalline silicon and mounted on the other side of said substrate so as to absorb a portion of the incident light from said substrate and to suppress reflection of the incident light in the interface between said silicon layer and said substrate.

3,997,908

SCHOTTKY GATE FIELD EFFECT TRANSISTOR

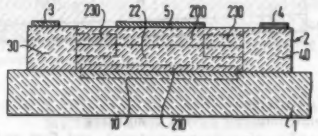
Heinrich Schloetterer, Putzbrunn-Solalinden, and Jenoe Tihanyi, Munich, both of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Mar. 28, 1975, Ser. No. 563,127

Claims priority, application Germany, Mar. 29, 1974, 2415408

Int. Cl.² H01L 29/80, 29/48, 27/12, 27/02

U.S. Cl. 357—22 20 Claims



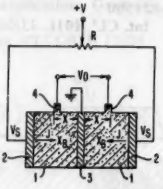
1. In a Schottky gate field effect transistor comprising a silicon body of one conductivity type on an insulator substrate, and source, drain and gate electrodes, the improvement which comprises a pn-junction located parallel to the surface of said substrate which produces a space charge zone extending to the surface of said substrate beyond the perimeter of said gate electrode, a relatively thin active layer located between said space charge zone and the gate electrode, said active layer having the same type conductivity as the silicon body and the source and drain areas, and a layer of opposite conductivity type disposed at the interface between said silicon body and said insulator substrate said pn-junction being formed by said layer of opposite conductivity type and said body.

3,997,909

HIGH CARRIER VELOCITY MAGNETIC SENSOR

Albert Watson Vinal, Cary, N.C., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed May 14, 1975, Ser. No. 577,254
Int. Cl.² H01L 27/22
U.S. Cl. 357—27 8 Claims



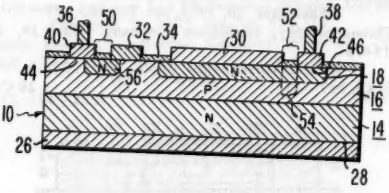
1. An improved magnetic flux sensor, comprising:
a body of semiconductive material having a resistance of at least 500 ohms per square;
a source of electrical voltage potential connected to separate contact points on said body, creating an electrical field therebetween of at least 500 volts per centimeter; and
an output contact located intermediate said voltage potential contact points on said body, said output providing a voltage output signal whenever said body is intersected by a magnetic flux field having at least some component of flux directed perpendicular to the plane in which said contact points lie.

3,997,910

SEMICONDUCTOR DEVICE WITH SOLDER CONDUCTIVE PATHS

Willem Gerard Einthoven, Belle Mead, and William Hulstrunk, Millburn, both of N.J., assignors to RCA Corporation, New York, N.Y.

Filed Feb. 26, 1975, Ser. No. 553,089
Int. Cl.² H01L 23/48
U.S. Cl. 357—68 11 Claims



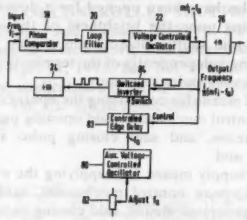
1. A semiconductor device comprising:
a body of semiconductor material, and first and second doped regions within said body,
first and second layers of solder on a surface of said body in spaced apart relation, said first layer being in contact with said first and second regions, and said second layer being in contact with said second region, said layers being electrically connected through only said first and said second regions, and
a terminal lead soldered to said second layer, the length of said second layer being small in comparison with the length of said first layer when measured in the directions of current between said terminal lead and said first region, whereby upon the soldering of said terminal lead to said second layer, the increase of resistance to current flow to said first region caused by flow of solder from said second layer onto said terminal lead is small.

3,997,911

SCREENED IMAGE REPRODUCTION

Michael J. Perriman, Boreham Wood; Richard M. Gascoigne, Kingston-upon-Thames, and Peter C. Pugsley, Pinner, all of England, assignors to Crosfield Electronics Limited, London, England

Filed Jan. 6, 1975, Ser. No. 538,580
Claims priority, application United Kingdom, Jan. 7, 1974, 700/74
Int. Cl.² H04N 1/46
U.S. Cl. 358—75 9 Claims



1. A method of reproducing images by half tone printing, in which an image to be reproduced is scanned to derive electric signals corresponding to density or colour-component density values of successively scanned elements of the image, and screen-representing signals are derived by generating x and y pulse trains in synchronism with the production of the image-representing signals resulting from the scanning in two respective mutually perpendicular directions of the image to be produced, generating first and second further pulse trains by multiplying the frequency of the x pulse train by respective first and second factors and generating third and fourth further pulse trains by multiplying the frequency of the y pulse train by third and fourth factors, the first, second, third and fourth factors being irrational or nearly irrational and being different functions of the screen angle selected for the printing; supplying the first and third pulse trains to first accumulating and combining means and the second and fourth pulse trains to second accumulating and combining means, each of the accumulating means being such that when the accumulated content exceeds a predetermined value, the predetermined value is subtracted from the accumulated output; applying the outputs of the accumulating and combining means to a function generator which produces a predetermined screen pattern signal which is a periodic two-dimensional function of the position of the scanned image element in the said two mutually perpendicular directions, whereby a pattern having a screen angle whose tangent is irrational or nearly irrational may be obtained, and combining the said periodic signal with the image-representing signal, the resulting signal being applied to an output device for making a half-tone print.

3,997,912

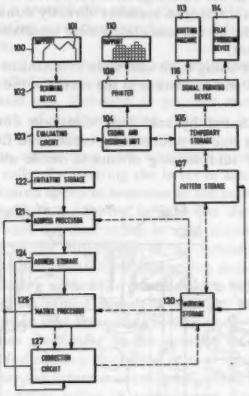
METHOD AND APPARATUS FOR AUTOMATIC PATTERNING CORRECTION

Hans-Joachim Zsagar, Karlsruhe, Germany, assignor to Firma Sulzer Morat GmbH, Bonlanden, Germany

Filed July 25, 1975, Ser. No. 600,514
Claims priority, application Germany, July 26, 1974, 2435982
Int. Cl.² H04N 9/04
U.S. Cl. 358—78 25 Claims

1. Method for the processing of information obtained from the scanning of a multicolored pattern, including scanning said pattern; obtaining individual information items by the scanning of pattern-fields, representing as color information items each clearly identifiable color and representing as uncertain information items each information obtained by the scanning of a pattern-field with a color not clearly identifiable;

and processing each uncertain information item by at least one correction matrix by testing information items from fields near the field associated with the uncertain information item



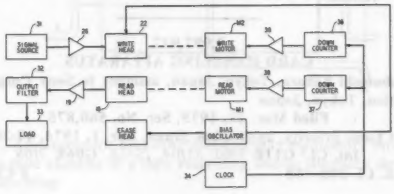
to determine whether certain conditions are met, and by replacing the uncertain information item, if such conditions are met, by a color information item as determined by the correction matrix.

3,997,913

ELECTRONIC TIME COMPRESSOR/EXPANDER UTILIZING MAGNETIC STORAGE

Otto E. Rittenbach, Neptune, N.J., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Jan. 9, 1975, Ser. No. 539,884
Int. Cl.² G11B *5/02, 27/10*
U.S. Cl. 360—8 **11 Claims**



1. Apparatus for compressing and expanding electronic signals which comprises:

a stationary cylinder having embedded therein at least one erase-head, at least one write-head, and at least one read-head, said erase-head, write-head and read-head being substantially evenly spaced about the circumference of said cylinder;

a magnetic ring positioned about said cylinder in engagement with said erase-head, write-head and read-head;

means for rotating said magnetic ring relative to said cylinder;

first connecting means for supplying the signal to be processed to said write-head at a first rate;

first timing means connected to said write-head for determining said first rate at which the signal to be processed is supplied to said write-head;

second connecting means for supplying the output of said read-head to an external load at a second rate; and

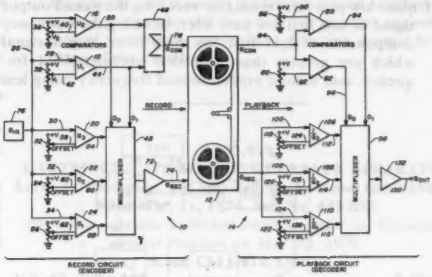
second timing means connected to said read-head for determining the rate at which the signal to be processed is read off said magnetic ring independent of said ring's rotational velocity.

3,997,914

ANALOG ENCODER DECODER CIRCUIT

Jack R. White, Camarillo, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Feb. 2, 1976, Ser. No. 654,132
Int. Cl.² G11B *5/02*
U.S. Cl. 360—27 **11 Claims**



1. An analog encoder/decoder for expanding the amplitude dynamic range of instrumentation tape recorders comprising:

a. means for providing an input signal;

b. a plurality of first amplifying means each receiving said input signal for producing a plurality of first amplified output signals, each of said plurality of first amplifying means providing a different signal gain, said signal gains of said plurality of first amplifying means forming a piecewise linear approximation of a logarithmic curve;

c. means connected to receive said input signal for generating a plurality of first d-c control signals that are a function of the amplitude of said input signal;

d. summing means being connected to receive said first d-c control signals for summing said first d-c control signals, said summing means having an output upon which a summed d-c control signal appears;

e. first switch means being connected to receive said d-c control signals and said first amplified output signals for passing one of said first amplified output signals in response to said first control signals to a first common output terminal;

f. recording means having at least two recording tracks, a first track being connected for recording said summed d-c control signal, a second track being connected for recording said first amplified output signal appearing on said first switch means output.

3,997,915

FREQUENCY MODULATING AND DEMODULATING METHOD AND APPARATUS

Eugene A. Cooper, Placentia, Calif., assignor to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany

Filed Apr. 24, 1975, Ser. No. 571,379
Int. Cl.² G11B *5/04*
U.S. Cl. 360—30 **7 Claims**

1. A modulating and demodulating apparatus comprising:

a. a signal source of modulating frequency,

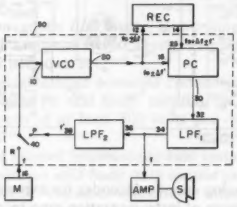
b. a voltage controlled oscillator having an input and an output and means for providing at said output a carrier signal of a frequency higher than said modulating frequency signal and which is frequency modulated in dependence upon said modulating frequency signal when impressed on said oscillator input,

c. recording means operatively connected for recording the signal appearing at said oscillator output and for playing back said recorded signal at a playback output,

d. phase comparator means operatively connected for comparing the phase of the signal appearing at said oscillator output with the phase of the signal appearing at said playback output and providing an output signal proportional to the difference in frequency between said compared signals at the output of said phase comparator,

e. low pass filter means for receiving said phase comparator output signal, blocking the frequency components of said phase comparator output signal which are greater than a first predetermined frequency and permitting the remainder of the frequency components of said phase comparator output signal to pass,

f. other low pass filter means for receiving the passed output signal of said first low pass filter, blocking the frequency components of said first low pass filter output signal which are greater than a second predetermined frequency, said second predetermined frequency being less



than said first, and permitting the remainder of the frequency components of said first low pass filter output signal to pass to an output,

g. output means for receiving said first low pass filter output signal and providing a demodulated output signal porportional thereto, and

h. switch means (1) for operatively connecting said modulating frequency signal source to said oscillator input when the apparatus is to be used for recording said modulating frequency signal, in frequency modulated form, (2) and for operatively connecting said second low pass filter output to said oscillator input when the apparatus is to be used for playing back said modulating frequency signal in the unmodulated form of said demodulated output signal thereby forming a phase-locked signal loop from said oscillator through said phase comparator means, through said first and second low pass filter means, through said switch means and back to said oscillator.

3,997,916

TAPE RECORDERS

Theophiel Clement Jozef Lodewijk Staar, Kraainem, Belgium, assignor to Staar, S.A., Brussels, Belgium

Filed July 23, 1974, Ser. No. 491,111

Claims priority, application Belgium, Aug. 14, 1973, 44280

Disclosure was also published under second Trial Voluntary Protest Program on Feb. 17, 1976

Int. Cl.² G11B *15/04*

U.S. Cl. 360—60 **3 Claims**

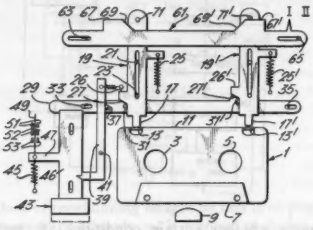
1. In a tape recorder apparatus for the recording of information on a magnetic tape extending between reels in a cartridge, said apparatus having means for transporting the tape and recording on the tape in a cartridge in both directions of tape travel, the tape cartridge being provided with a pair of recesses corresponding respectively to each direction of tape travel and a removable tab over each recess, said apparatus having sensing and control means cooperating with said removable tabs for preventing recording in either direction of tape travel when the corresponding tab is absent, the improvement in said sensing and control means comprising:

a movable tape direction control slide having two positions corresponding respectively to the directions of tape travel,

a first and second sensing means each including a movable slide mechanism mounted in said apparatus for sensing the absence of said removable tabs by movement into the recesses in the cartridge at the location of said tabs and a displaceable output member directly connected for displacement by the associated slide mechanism upon such movement,

means for biasing each said slide mechanism against one of said tabs and to move into the recess in the absence of the tab,

means actuated by said tape direction control slide for disabling one of said sensing means and for enabling the other of said sensing means to sense and produce an



output reflecting the absence of the removable tab corresponding to the direction of tape travel by the slide mechanism moving into the recess in the cartridge at the location of said tab and displacing the associated output member,

a movable recording function indicator, said indicator being slidably mounted and biased in one direction,

a latching mechanism for said indicator operated in response to the displacement of the output member by said enabled sensing means to unlatch said indicator allowing it to move in the direction of bias,

the unlatched condition of the recording function indicator providing an indication that tape recording is to be prevented.

3,997,917

CARD HANDLING APPARATUS

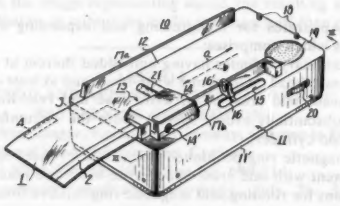
Nobutoshi Kihara, Tokyo, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Mar. 21, 1975, Ser. No. 560,875

Claims priority, application Japan, Apr. 1, 1974, 49-36855

Int. Cl.² G11B *5/80, 25/04, 19/18*; **G06K** *7/08*

U.S. Cl. 360—88 **5 Claims**



1. An apparatus for recording and/or reproducing information signals in a record track extending parallel with an edge of a rectangular card, comprising:

means defining a card supporting surface with guides thereon for guiding a card in movement over said surface in forward and return directions parallel to said edge of the card;

transducer means positioned to scan the record track on a card during said movement of the latter;

a capstan roller engageable with a card on said surface for driving the card in said forward and return directions in response to rotation of said capstan roller in a first direction and a second direction, respectively;

a reciprocating actuating member movable manually in one direction;

spring means connected with said actuating member and being loaded in response to movement of the latter manually in said one direction to provide motive power for movement of said actuating member in the opposite direction when said actuating member is released;

gear means connecting said actuating member with said capstan roller for rotating the latter in said first direction at any desired speed in response to the manual movement of said actuating member in said one direction and for rotating said capstan roller in said second direction in response to the movement of the actuating member in said opposite direction by said spring means;

speed regulating means for establishing a substantially uniform predetermined speed of rotation of said capstan roller only in said second direction; and

switch means responsive to the position of said actuating member for causing operation of said transducer means only during the return movement of a card by the rotation of said capstan roller in said second direction at said predetermined speed.

3,997,918

TAPE RECORDING AND PLAYBACK APPARATUS OF THE CASSETTE TYPE

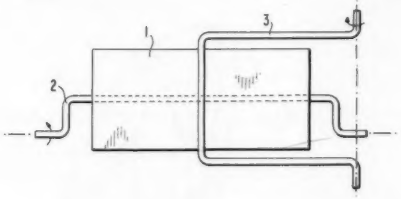
Rodolfo Cicatelli, Gandria-Lugano, Switzerland

Filed Feb. 11, 1975, Ser. No. 549,087

Claims priority, application Italy, Feb. 11, 1974, 48273/74

Int. Cl.² G11B *15/60*; **B65H** *17/48*

U.S. Cl. 360—137 **9 Claims**



1. Apparatus for receiving and enabling translatory motion of a tape cassette in a tape recording and/or playback device comprising:

means defining a cavity for receiving a tape cassette having a planar configuration, a first guide superposed over and engageable with the cassette when received within said cavity and pivotal about a first predetermined axis parallel to the plane of the cassette, a second guide underlying the cassette when received within said cavity and on the opposite side thereof from said first guide, said second guide being pivotal about a second predetermined axis parallel to the plane of the cassette and normal to said first axis, and means for biasing said second guide for movement in a direction toward said first guide to engage the cassette and maintain the latter between said first and second guides whereby the cassette is movable against the bias of said biasing means in a direction normal to the plane of the cassette.

3,997,919

CARTRIDGE TAPE MACHINE CLEANER APPARATUS

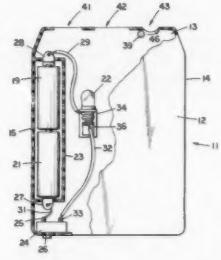
Larry L. Thompson, 2012 N. Bell St., Kokomo, Ind. 46901

Filed Mar. 11, 1974, Ser. No. 449,892

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 23, 1976

Int. Cl.² G11B *5/41*

U.S. Cl. 360—137 **8 Claims**



1. Apparatus for facilitating access to the tape-contacting and associated elements in a cartridge tape machine comprising a tape cartridge shell defining an open area in its rear portion and a first open area in its front portion and operable to be inserted in a cartridge tape machine, and illumination means attached to the shell for lighting the interior of the cartridge tape machine when the shell is inserted in the cartridge tape machine.

DESIGN PATENTS

GRANTED DECEMBER 14, 1976

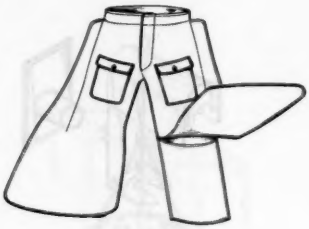
ERRATA

For CLASS	See PATENT NO.
015–054	242,686
011–143	242,736
015–029	242,737
015–078	242,744

DECEMBER 14, 1976

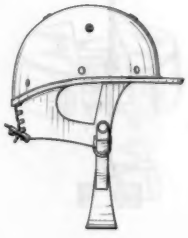
NOTE—A cross reference listing of applications published under the second Trial Voluntary Protest Program is located in the back of this Issue. These entries will be in numerical order by document publication number.

242,663
TROUSERS OR SIMILAR ARTICLE
Johnny L. Tidwell, Jr., 856 34th St., Oakland, Calif. 94608
Filed Feb. 25, 1975, Ser. No. 552,853
Term of patent 14 years
Int. Cl. D2—*02*
U.S. Cl. D2—28

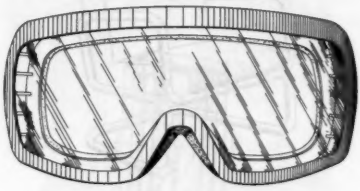


242,664
SHIRT OR SIMILAR ARTICLE
Johnny L. Tidwell, Jr., 856 34th St., Oakland, Calif. 94608
Filed Feb. 25, 1975, Ser. No. 552,852
Term of patent 14 years
Int. Cl. D2—*02*
U.S. Cl. D2—208

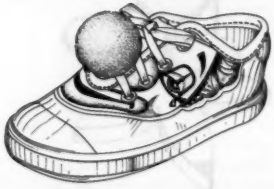
242,665
RIDING HELMET
Thomas G. Kewish, 8741 Shirley Ave., Northridge, Calif. 91324
Filed Feb. 27, 1975, Ser. No. 553,570
Term of patent 14 years
Int. Cl. D2—*03*
U.S. Cl. D2—231



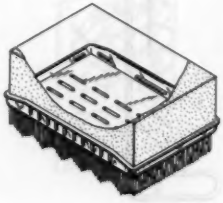
242,666
VENTILATED SPORTS GOGGLES
Ardella M. Smith, P.O. Box 700, Evergreen, Colo. 80439
Filed Apr. 23, 1975, Ser. No. 570,786
Term of patent 14 years
Int. Cl. D2—*03*
U.S. Cl. D2—234



242,667
CHILD'S SHOE
Donna L. Gavin, Waterbury, Conn., assignor to Uniroyal, Inc.
Filed Dec. 4, 1974, Ser. No. 529,671
Term of patent 14 years
Int. Cl. D2—*04*
U.S. Cl. D2—278



242,668
COMBINED BRUSH AND SPONGE
Jack W. Kaufman, Merrick, N.Y., assignor to Bio-Med Plastics, Inc., Merrick, N.Y.
Filed July 9, 1975, Ser. No. 594,309
Term of patent 14 years
Int. Cl. D4—*02*
U.S. Cl. D4—17

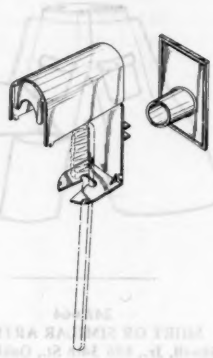


242,669
CHAIR
Miroslav Arandjelovic, Toronto, Canada, assignor to All-Tube Products Limited
Filed Mar. 13, 1975, Ser. No. 558,167
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—56

242,670
EARRING STAND
Ruth A. Northup, Nine Partners Road, Clinton Corners, N.Y. 12514
Filed Dec. 11, 1974, Ser. No. 531,679
Term of patent 14 years
Int. Cl. D6—*99*
U.S. Cl. D6—85

242,671
GRAB BAR DEVICE
Morton I. Thomas, Monroe, N.Y., assignor to Temco Products, Inc., Passaic, N.J.
Filed June 4, 1973, Ser. No. 366,536
Term of patent 14 years
Int. Cl. D23—*02*
U.S. Cl. D6—86

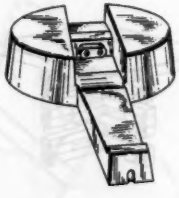
242,672
COMBINED TOOTHBRUSH HOLDER AND BRACKET
John Madison Harris, P.O. Box 2819, West Palm Beach, Fla. 33402
Filed July 2, 1974, Ser. No. 479,681
Disclosure was also published under second Trial Voluntary Protest Program on Mar. 16, 1976
Term of patent 14 years
Int. Cl. D23—*02*
U.S. Cl. D6—94



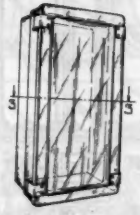
242,673
DISPLAY HANGER FOR SMALL ARTICLES OR THE LIKE
Charles M. Moody, Brecksville, Ohio, and Frederick L. Priebe, Homewood, Ill., assignors to Swift & Company, Chicago, Ill.
Filed Apr. 1, 1975, Ser. No. 564,107
Term of patent 14 years
Int. Cl. D20—*02*
U.S. Cl. D6—113

242,674
HANGING PLANTER OR SIMILAR ARTICLE
Doris Sweeney, 512 A Taylor Ave., Warrington, Pa. 18976, and Mary Ellen Lee, 7951 Anita Drive, Philadelphia, Pa. 19111
Filed May 27, 1975, Ser. No. 581,153
Term of patent 14 years
Int. Cl. D11—*02*; D6—*04*
U.S. Cl. D6—113

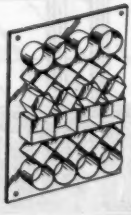
242,675
COMBINED SUPPORT STAND AND POWER SUPPLY FOR CORDLESS HAIR CURLING IRON
Samuel L. McNair, Kansas City, Mo., assignor to Dazey Products Co., Kansas City, Mo.
Filed Mar. 19, 1976, Ser. No. 668,530
Term of patent 14 years
Int. Cl. D6—*04*; D13—*02*
U.S. Cl. D6—114



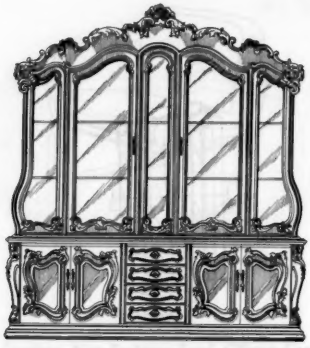
242,676
CABINET FOR FIRE EXTINGUISHERS
James Gordon Haas, 5028 Chatsworth Road, Toledo, Ohio 43614
Filed Mar. 22, 1976, Ser. No. 669,197
Term of patent 7 years
Int. Cl. D6—*04*
U.S. Cl. D6—127



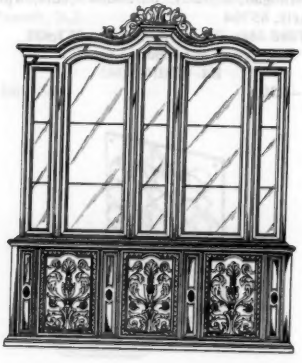
242,677
COMPARTMENTALIZED STORAGE UNIT
Robert H. Milligan, 6301 N. Barcelona Court, Apt. 1011, Tucson, Ariz. 85704
Filed Mar. 27, 1975, Ser. No. 562,985
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—130



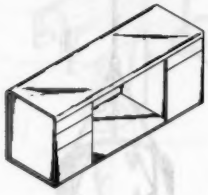
242,678
BREAKFRONT OR THE LIKE
Joseph E. Adkinson, Chevy Chase, Md., assignor to Wilfred G. Caldwell, Arlington, Va.
Filed Apr. 23, 1974, Ser. No. 463,282
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—154



242,679
BREAKFRONT OR THE LIKE
Joseph E. Adkinson, Chevy Chase, Md., assignor to Wilfred G. Caldwell, Arlington, Va.
Filed Apr. 23, 1974, Ser. No. 463,283
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—154

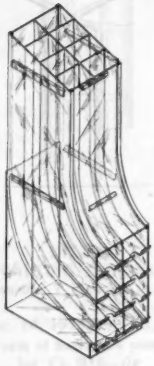


242,680
PEDESTAL DESK
William Sklaroff, 726 E. Conshohocken State Road, Penn Valley, Pa. 19072
Filed Aug. 5, 1975, Ser. No. 602,091
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—161



242,681
TABLE
Eugene D. Thomas, 507 W. Fullerton Ave., Chicago, Ill. 60614
Filed June 4, 1975, Ser. No. 583,578
Term of patent 14 years
Int. Cl. D6—*03*
U.S. Cl. D6—177

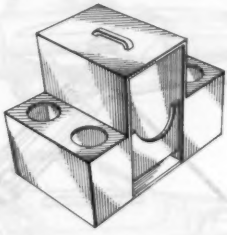
242,682
COMBINED DISPLAY AND DISPENSING STAND FOR CIGARETTE PACKAGES
Bertram J. Cain, Brookfield, Ill., and Walter R. Whiteman, Winston-Salem, N.C., assignors to R. J. Reynolds Tobacco Company, Winston-Salem, N.C.
Filed Nov. 5, 1975, Ser. No. 628,874
Term of patent 14 years
Int. Cl. D6—*04*; D20—*02*
U.S. Cl. D6—189



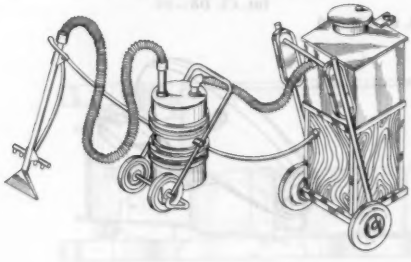
242,683
ROCKABLE FOOT STOOL
Donald E. Osborne, 321 Worley St., Washington Court House, Ohio 43160
Filed Mar. 12, 1975, Ser. No. 557,635
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—200

242,684
FEEDING DISH
Paul Kenneth Meeker, 412 Park Ave., Kent, Ohio 44240
Filed Sept. 11, 1975, Ser. No. 612,289
Term of patent 14 years
Int. Cl. D7—*01*
U.S. Cl. D7—5

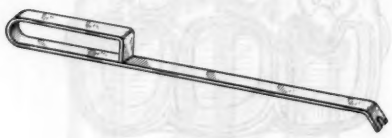
242,685
PORTABLE BEVERAGE CADDY
Seymour S. Skidell, 3400 Pine Tree Drive, Miami Beach, Fla. 33140
Filed Feb. 26, 1975, Ser. No. 553,174
Term of patent 14 years
Int. Cl. D7—*99*; D9—*03*
U.S. Cl. D7—71



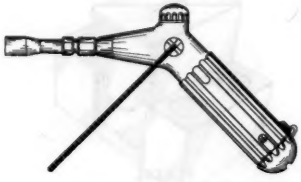
242,686
CARPET CLEANING MACHINE
Jack A. Bates, 4350 Latin Lane, Columbus, Ohio 43220
Filed Dec. 6, 1973, Ser. No. 422,322
Term of patent 14 years
Int. Cl. D7—*05*
U.S. Cl. D15—54



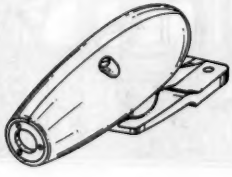
242,687
GRILL CLEANER
Dewey O. Broberg, Jr., Rte. 1, Box 102, Long Grove, Ill. 60047
Filed Sept. 15, 1975, Ser. No. 613,298
Term of patent 14 years
Int. Cl. D7—*05*
U.S. Cl. D7—184



242,688
SELF-CONTAINED BRAZING TORCH OR THE LIKE
Daniel E. McCue, Santa Barbara, Calif., assignor to Cleanweld Products, Inc., Los Angeles, Calif.
Filed Nov. 4, 1975, Ser. No. 628,582
Term of patent 14 years
Int. Cl. D8—*05*
U.S. Cl. D8—30

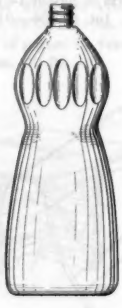


242,689
CHAIN SAW POWER TAKE-OFF FOR DRILLING OR THE LIKE
John Arthur Notaras, and Angelo Lambrinos Notaras, both of 15-21 Reynolds St., Balmain, New South Wales, Australia
Filed Aug. 11, 1975, Ser. No. 605,164
Term of patent 14 years
Int. Cl. D8—*99*
U.S. Cl. D8—70



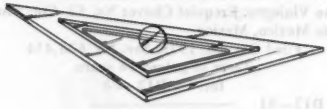
242,690
HOLD DOWN DEVICE FOR SECURING A LINE OR FLEXIBLE MEMBER TO THE GROUND
Lois R. Brown, 112 Florence Drive, Cordell, Okla. 73632
Filed Nov. 29, 1974, Ser. No. 528,215
Term of patent 14 years
Int. Cl. D8—*08*
U.S. Cl. D8—229

242,691
BOTTLE
Victor Koenigsberg, Franklin Square, N.Y., assignor to Colgate-Palmolive Company, New York, N.Y.
Filed Mar. 19, 1975, Ser. No. 559,903
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—91



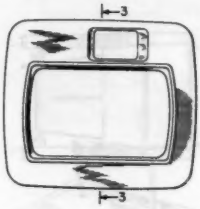
242,692
COMBINED BOTTLE AND CAP
Bernard A. Mitchell, 1000 N. Lake Shore Drive, Chicago, Ill. 60611
Filed Aug. 20, 1975, Ser. No. 606,016
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—168

242,693
DRAFTING TRIANGLE
Robert Vincent Kennedy, 7 Wendell St. No. 4, Cambridge, Mass. 02138
Filed Mar. 10, 1975, Ser. No. 550,788
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—62



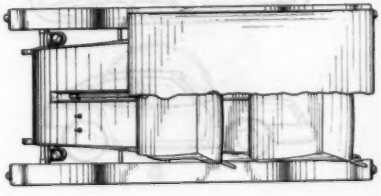
242,694
ELECTROOPTIC TIMEPIECE FACE
Harwell B. Thompson, and Milton B. Sheffield, both of Cheshire, Conn., assignors to Timex Corporation, Waterbury, Conn.
Filed June 6, 1975, Ser. No. 584,328
Term of patent 14 years
Int. Cl. D10—*01*
U.S. Cl. D10—126

242,695
DIGITAL TIME PIECE DISPLAY MASKING PLATE
Eiichi Osawa; Midori Miyata, both of Tokyo, and Susumu Karibe, Matsudo, all of Japan, assignors to Kabushiki Kaisha Daini Seikosha, Japan
Filed Aug. 25, 1975, Ser. No. 607,507
Term of patent 14 years
Int. Cl. D10—*07*
U.S. Cl. D10—132

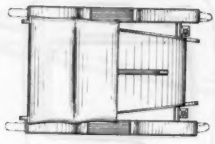


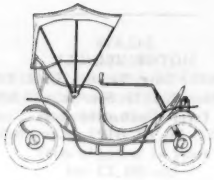
242,696
MOTOR VEHICLE
Robert A. Keyes, 6897 Dove, Ventura, Calif. 93003
Filed Oct. 2, 1975, Ser. No. 618,839
Term of patent 14 years
Int. Cl. D12—*08*
U.S. Cl. D12—85

242,697
AUTOMOTIVE VEHICLE
Guillermo Viniegra, Ezequiel Chavez No. 52, Col. Vista Bella, Edo. de Mexico, Mexico
Filed Aug. 1, 1975, Ser. No. 601,004
Term of patent 14 years
Int. Cl. D12—*08*
U.S. Cl. D12—86

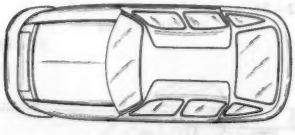


242,698
AUTOMOTIVE VEHICLE BODY
Guillermo Viniegra, Ezequiel Chavez No. 52, Col. Vista Bella, Edo. de Mexico, Mexico
Filed Aug. 1, 1975, Ser. No. 601,003
Term of patent 14 years
Int. Cl. D12—*08*
U.S. Cl. D12—86

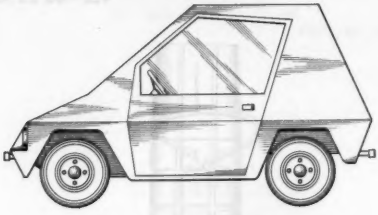


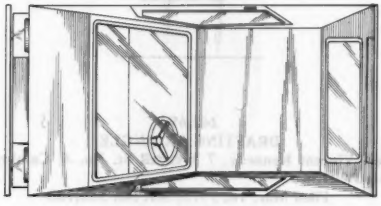


242,699
AUTOMOBILE
Walter S. Eggert, Jr., Huntingdon Valley, Pa., assignor to The Budd Company
Filed July 18, 1975, Ser. No. 597,063
Term of patent 14 years
Int. Cl. D12—*08*
U.S. Cl. D12—91

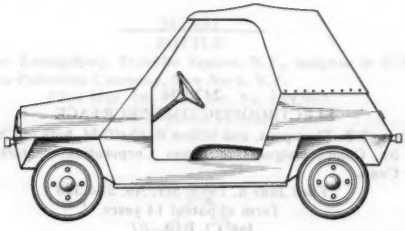


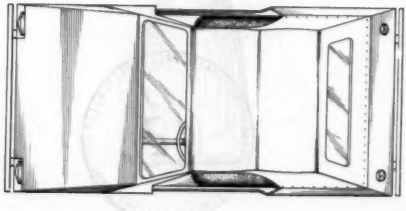
242,700
AUTOMOTIVE VEHICLE
Guillermo Viniegra, Ezequiel Chavez No. 52, Col. Vista Bella, Edo. de Mexico, Mexico
Filed Oct. 28, 1975, Ser. No. 626,433
Term of patent 14 years
Int. Cl. D12—*08*
U.S. Cl. D12—91



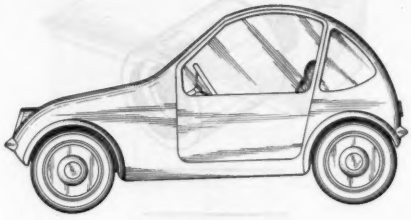


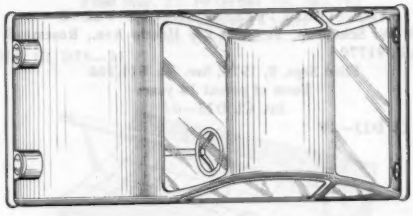
242,701
AUTOMOTIVE VEHICLE
Guillermo Viniegra, Ezequiel Chavez No. 52, Col. Vista Bella, Edo. de Mexico, Mexico
Filed Oct. 28, 1975, Ser. No. 626,434
Term of patent 14 years
Int. Cl. D12—*08*
U.S. Cl. D12—91



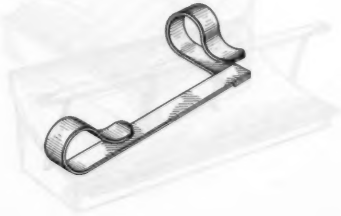


242,702
AUTOMOTIVE VEHICLE
Guillermo Viniegra, Ezequiel Chavez No. 52, Col. Vista Bella, Edo. de Mexico, Mexico
Filed Nov. 3, 1975, Ser. No. 628,251
Term of patent 14 years
Int. Cl. D12—*08*
U.S. Cl. D12—91



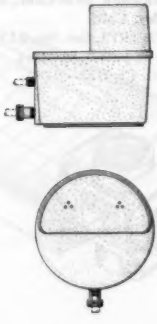


242,703
BOOK PAGE HOLDER
Macy O. Teetor, 24 Orpheum Ave., Metairie, La. 70005
Filed June 18, 1975, Ser. No. 588,023
Term of patent 14 years
Int. Cl. D19—*99*
U.S. Cl. D19—34



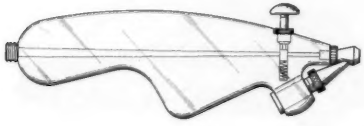
242,704
COMBINED DESK SET AND CALENDAR
Richard H. Coatney, 7235 Hollywood Blvd., Los Angeles, Calif. 90046
Filed Apr. 29, 1974, Ser. No. 465,086
Term of patent 14 years
Int. Cl. D19—*02*
U.S. Cl. D19—75

242,705
SWIMMING POOL CHLORINATOR
A. Fred Fedrigo, 35750 Industrial Road, Livonia, Mich. 48150
Filed Jan. 19, 1976, Ser. No. 650,549
Term of patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—3

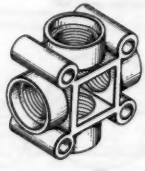


242,706
SPRINKLER BASE
John M. Elek, 5111 Corning Ave., Los Angeles, Calif. 90056
Filed Aug. 20, 1975, Ser. No. 606,289
Term of patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—7

242,707
AIR BRUSH
Gary E. Phillips, Encino, Calif., assignor to Donald E. Bass, Canoga Park, Calif.
Filed Feb. 6, 1976, Ser. No. 655,757
Term of patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—17



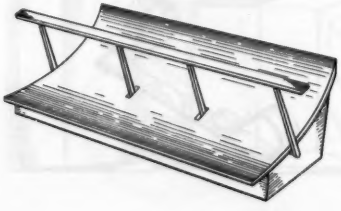
242,708
VALVE HOUSING OR SIMILAR ARTICLE
Emery Major, Larkspur; James L. McDonald, and Harry R. McDonald, both of Richmond, all of Calif., assignors to Altex Scientific, Inc., Berkeley, Calif.
Filed Feb. 27, 1975, Ser. No. 553,897
Term of patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—19



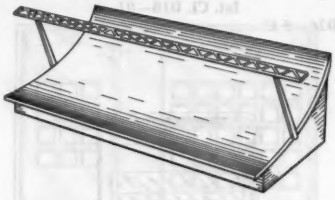
242,709
ADJUSTABLE PRESSURE RELIEF VALVE
Ralph W. Schourup, 3950 N. Rio Hondo Ave., Rosemead, Calif. 91770
Filed Sept. 8, 1975, Ser. No. 611,068
Term of patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—19

242,710
ADJUSTABLE PRESSURE RELIEF VALVE
Ralph W. Schourup, 3950 N. Rio Hondo Ave., Rosemead, Calif. 91770
Filed Sept. 8, 1975, Ser. No. 611,166
Term of patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—19

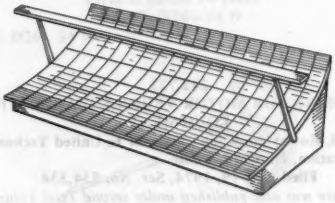
242,711
BUILDING STRUCTURE
Irwin R. Barr, Lutherville, Md., assignor to AAI Corporation
Filed Mar. 27, 1975, Ser. No. 562,641
Term of patent 14 years
Int. Cl. D25—*03*
U.S. Cl. D25—21



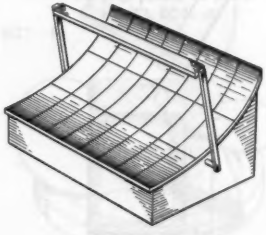
242,712
BUILDING STRUCTURE
Irwin R. Barr, Lutherville, Md., assignor to AAI Corporation
Filed Mar. 27, 1975, Ser. No. 562,642
Term of patent 14 years
Int. Cl. D25—*03*
U.S. Cl. D25—21



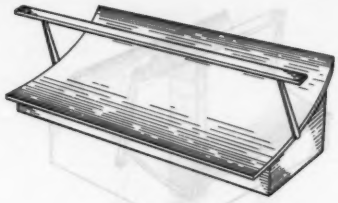
242,713
BUILDING STRUCTURE
Irwin R. Barr, Lutherville, Md., assignor to AAI Corporation
Filed Mar. 27, 1975, Ser. No. 562,752
Term of patent 14 years
Int. Cl. D25—*03*
U.S. Cl. D25—21



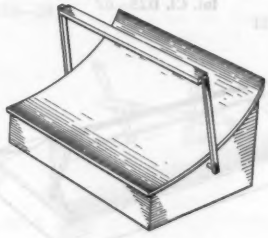
242,714
BUILDING STRUCTURE
Irwin R. Barr, Lutherville, Md., assignor to AAI Corporation
Filed Mar. 27, 1975, Ser. No. 562,753
Term of patent 14 years
Int. Cl. D25—*03*
U.S. Cl. D25—21



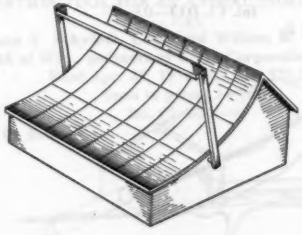
242,715
BUILDING STRUCTURE
Irwin R. Barr, Lutherville, Md., assignor to AAI Corporation
Filed Mar. 27, 1975, Ser. No. 562,754
Term of patent 3½ years
Int. Cl. D25—*03*
U.S. Cl. D25—21



242,716
BUILDING STRUCTURE
Irwin R. Barr, Lutherville, Md., assignor to AAI Corporation
Filed Mar. 27, 1975, Ser. No. 562,755
Term of patent 14 years
Int. Cl. D25—*03*
U.S. Cl. D25—21

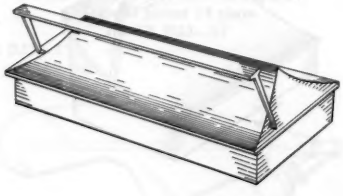


242,717
BUILDING STRUCTURE
Irwin R. Barr, Lutherville, Md., assignor to AAI Corporation
Filed Mar. 27, 1975, Ser. No. 562,756
Term of patent 14 years
Int. Cl. D25—*03*
U.S. Cl. D25—21

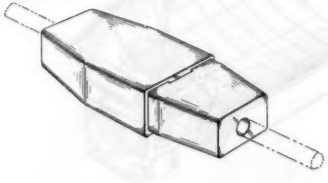


242,718
BUILDING STRUCTURE
Irwin R. Barr, Lutherville, Md., assignor to AAI Corporation
Filed Mar. 27, 1975, Ser. No. 562,757
Term of patent 14 years
Int. Cl. D25—*03*
U.S. Cl. D25—21

242,719
BUILDING STRUCTURE
Irwin R. Barr, Lutherville, Md., assignor to AAI Corporation
Filed Mar. 27, 1975, Ser. No. 562,787
Term of patent 14 years
Int. Cl. D25—*03*
U.S. Cl. D25—21

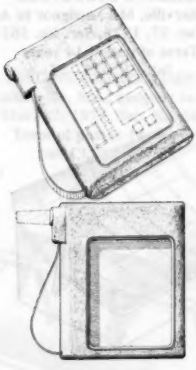


242,720
COMBINED ELECTRIC PLUG AND RECEPTACLE THEREFOR
Leonard T. Loforese, Greenwich, Conn., assignor to Consolidated Foods Corporation, Chicago, Ill.
Filed June 4, 1975, Ser. No. 583,886
Term of patent 14 years
Int. Cl. D13—*03*
U.S. Cl. D26—1 B

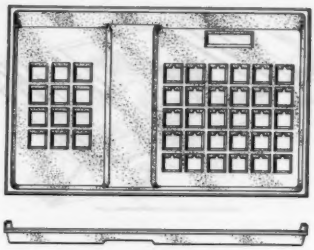


242,721
ELECTRONIC CALCULATOR
Lewis H. Herr, Lansdale, Pa.; Paul W. Porter, Lawrence, Mass., and John S. Kovacs, East Norriton, Pa., assignors to Sperry Rand Corporation, New York, N.Y.
Filed Aug. 26, 1974, Ser. No. 500,408
Disclosure was also published under second Trial Voluntary Protest Program on Mar. 16, 1976
Term of patent 7 years
Int. Cl. D18—*01*
U.S. Cl. D26—5 C

242,722
HOUSING FOR MOTOR VEHICLE DIAGNOSTIC EQUIPMENT
Mace Bell, Rowayton, Conn., assignor to United Technologies Corporation, Hartford, Conn.
Filed Dec. 19, 1974, Ser. No. 534,334
Disclosure was also published under second Trial Voluntary Protest Program on Mar. 16, 1976
Term of patent 14 years
Int. Cl. D14—*02*; D10—*05*
U.S. Cl. D26—5 C

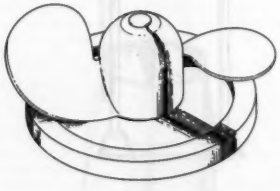


242,723
PUSHBUTTON TELEPHONE SHIELD PLATE
Joseph Monroe Jackson, Menlo Park, Calif., assignor to Litton Business Telephone Systems, Inc., Sunnyvale, Calif.
Filed Nov. 13, 1975, Ser. No. 631,697
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D26—14 A



242,724
HEADSET
S. Dan Brodie, 5601 Denton Place, Oakland, Calif. 94619
Filed Nov. 19, 1975, Ser. No. 633,569
Term of patent 14 years
Int. Cl. D26—*14 H*
U.S. Cl. D26—14 H

242,725
ASHTRAY
James J. Maune, 6 Sylvia Lane, Plainview, N.Y. 11803
Filed Apr. 22, 1975, Ser. No. 570,857
Term of patent 14 years
Int. Cl. D27—*03*
U.S. Cl. D27—16

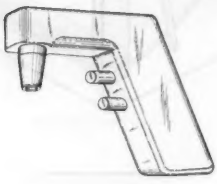


242,726
CIGARETTE LIGHTER
Gail Okazawa, Tokyo, Japan, assignor to Kanazawa Industries Co., Ltd.
Filed Aug. 1, 1975, Ser. No. 601,396
Term of patent 14 years
Int. Cl. D27—*05*
U.S. Cl. D27—42

242,727
MUZZLE FOR A DOG
Antonia Torres, 121 W. 72nd St., New York, N.Y. 10023
Filed June 6, 1975, Ser. No. 584,332
Term of patent 14 years
Int. Cl. D30—*04*
U.S. Cl. D30—38

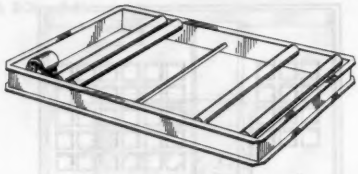
242,728
INSERTION TOOL FOR AN ANIMAL INDENTIFICATION TAG
Jackson T. Schwindt, Cody, and William B. Sheets, Powell, both of Wyo., assignors to Y-Tex Corporation, Cody, Wyo.
Filed Apr. 25, 1975, Ser. No. 571,752
Term of patent 14 years
Int. Cl. D30—*99*
U.S. Cl. D30—99

242,729
AUTOMATIC PIPETTE OR THE LIKE
James W. Kenney, Radnor, Pa., assignor to Drummond Scientific Company, Broomall, Pa.
Filed May 30, 1975, Ser. No. 582,264
Term of patent 14 years
Int. Cl. D24—*02*
U.S. Cl. D32—2 C

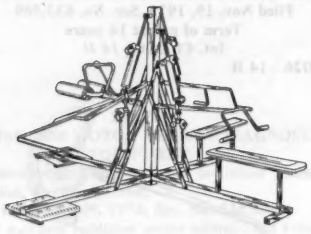


242,730
GOLF PUTTER
Charles A. Pappas, 2212 "L" St. NE. Apt. A. Auburn, Wash. 98002
Filed Oct. 15, 1974, Ser. No. 514,659
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—5 GC

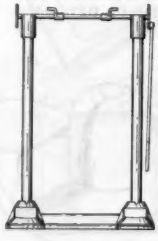
242,731
BICYCLE EXERCISE SUPPORT
Robert E. Taylor, 23135 Samuel St., Apt. 10, Torrance, Calif. 90505
Filed Mar. 21, 1975, Ser. No. 560,951
Term of patent 3½ years
Int. Cl. D21—*02*
U.S. Cl. D34—5 K



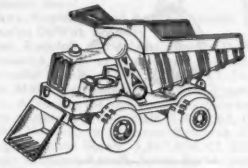
242,732
PHYSICAL EXERCISER
Jerry D. Brentham, 102 Elm Drive, Belton, Tex. 76513
Filed June 19, 1975, Ser. No. 588,410
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—5 K



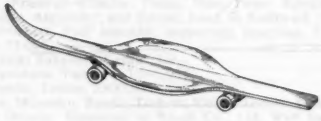
242,733
TOY HORIZONTAL BAR
Osamu Takahashi, Tokyo, Japan, assignor to Tomy Kogyo Co., Inc.
Filed July 7, 1975, Ser. No. 593,236
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5 K



242,734
TOY TRUCK WITH PLOW
Jack L. Breneman, Orchard Park, and Jeffrey T. Samson, East Aurora, both of N.Y., assignors to The Quaker Oats Company, Chicago, Ill.
Filed Sept. 16, 1974, Ser. No. 506,102
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 AJ



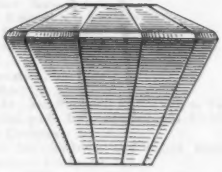
242,735
SKATE COASTER
Robert A. Candler, 2911 De La Vina St., Santa Barbara, Calif. 93105
Filed Mar. 31, 1975, Ser. No. 563,583
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 AJ



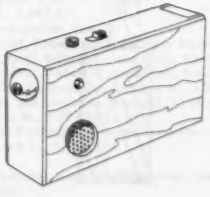
242,736
PLANT POT
James Pressley Craft, III, and Alan G. Blizzard, both of Claremont, Calif., assignors to Thermal Hydraulics Corporation
Filed Jan. 20, 1976, Ser. No. 650,721
Term of patent 14 years
Int. Cl. D11—*02*
U.S. Cl. D11—143

242,737
CULTIVATOR TINE
Ary van der Lely, 10, Weverskade, Maasland, and Cornelis Johannes Gerardus Bom, 36, Esdoornlaan, Rozenburg, both of Netherlands
Filed May 29, 1975, Ser. No. 581,861
Claims priority, application Switzerland, Nov. 29, 1974, 59928/74
Term of patent 14 years
Int. Cl. D15—*03*
U.S. Cl. D15—29

242,738
SCULPTURAL ORNAMENT
Amnon Michaeli, 135-03 73rd Terrace, Kew Gardens Hills, Queens, N.Y. 11415
Filed May 11, 1973, Ser. No. 359,490
Term of patent 14 years
Int. Cl. D26—*99, 01*
U.S. Cl. D48—7 R



242,739
PAPER MONEY IDENTIFIER
Thomas R. Page, Delta Meters, 1717 W. 9th St., Los Angeles, Calif. 90015
Filed Feb. 7, 1975, Ser. No. 547,982
Term of patent 14 years
Int. Cl. D10—*06*
U.S. Cl. D52—4 R



242,740
RADIO
Kunio Takei, Room 603, Block A, 6th Floor, Watson's Estate, North Point, Hong Kong
Filed Aug. 5, 1974, Ser. No. 494,739
Claims priority, application United Kingdom, May 10, 1974, 966610/74
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D56—4 B

242,741
ELECTROLUMINESCENT CHARACTER D
Michael A. Cannon, Oakland, Calif., assignor to Micon Industries
Filed Sept. 3, 1974, Ser. No. 503,034
Term of patent 14 years
Int. Cl. D18—*03*
U.S. Cl. D64—12 B

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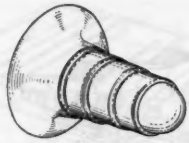
DOUCHE BAG OR THE LIKE
William C. Christine, Catasaque, and W. E. R. Watt, Barto, both of Pa., assignors to Inpaco, Coplay, Pa.
Filed June 28, 1974, Ser. No. 484,297
Term of patent 14 years
Int. Cl. D24—*99*
U.S. Cl. D83—1 P

242,743
EAR PLUG
Charles Leight, 118 S. Orlando Ave., Los Angeles, Calif. 90048
Filed Aug. 28, 1975, Ser. No. 608,661
Term of patent 14 years
Int. Cl. D25—*01*
U.S. Cl. D83—1 J



242,744
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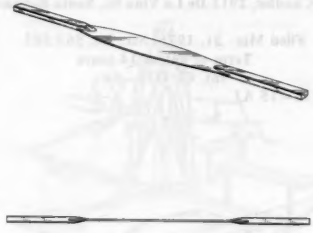
Thomas G. Rendleman, 314 S. Kansas, and Stephen F. Young, 528 Grace Terrace, both of Olathe, Kans. 66061
Filed May 5, 1975, Ser. No. 574,291
Term of patent 14 years
Int. Cl. D24—*99*
U.S. Cl. D83—12 R



242,745
YARN CONE
Charles R. Langston, Jr., Seneca, S.C., assignor to Coats & Clark, Inc.
Filed Nov. 11, 1974, Ser. No. 522,463
The portion of the term of this patent subsequent to June 3, 1989, has been disclaimed.
Term of patent 14 years
Int. Cl. D15—*06*
U.S. Cl. D15—78

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Bauman, Thomas G.; and Balaska, Robert J., to Remington Arms Company, Inc. Bolt latch. 3,996,684, Cl. 42-16.000.

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Baumann, Hans D. Flow control valve. 3,997,141, Cl. 251-205.000.

Baxter Laboratories, Inc.: *See—*
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Begey, Jean-Marie, to Garcia Corporation. Safety ski binding. 3,997,188, Cl. 280-613.000.

Beisel, Hermann, to Heidelberger Druckmaschinen Aktiengesellschaft. Device for controlling the doctor roller of a printing press. 3,996,856, Cl. 101-350.000.

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Bergen, Richard F., to Xerox Corporation. Color image reproduction system. 3,997,243, Cl. 350-161.00S.

Berghgracht, Marius Leopold Hypolite. Watertight package apparatus. 3,997,054, Cl. 206-386.000.

Bergman, Richard C.; and Williams, Kenneth R., to Du Pont de Nemours, E. I., and Company. Tubing articles. 3,996,968, Cl. 138-118.000.

Bergstrom, Harold G. Ball retriever attachment. 3,997,169, Cl. 273-162.00E.

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Bernhardt, Frederick William. Method of making a cartridge. 3,996,722, Cl. 53-37.000.

Besik, Ferdinand; and Deshpande, Anant S., to Ontario Research Foundation. Waste disposal system. 3,996,862, Cl. 110-10.000.

Besselink, Lucas, to U.S. Philips Corporation. Method of manufacturing colored glass articles. 3,997,312, Cl. 65-30.00E.

Best, Walter E. High security locking mechanism. 3,996,774, Cl. 70-32.000.

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Betz, Gregor; and Scholz, Hugo-Peter, to Fried. Krupp Gesellschaft mit beschrankter Haftung. Gas analysis device. 3,997,837, Cl. 324-71.0SN.

Beuther, Harold; Chun, Sun W.; and Montagna, Angelo A., to Gulf Research & Development Company. Hydrodesulfurization process employing a titanium promoted catalyst. 3,997,431, Cl. 208-216.000.

Beverley, John A.; and Koch, Richard L., to General Electric Company. Electrical propulsion system and control arrangements therefor. 3,997,824, Cl. 318-144.000.

Bhagat, Gopal C., to Xerox Corporation. Apparatus for reducing image background in electrostatic reproduction machines. 3,997,259, Cl. 355-3.00R.

Bianchi, Nereo, to Necchi S.p.A. Upper thread tension adjusting assembly with automatic release device. 3,996,866, Cl. 112-254.000.

Bidgood, Robin: *See—*
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Blanque, Pierre. Device for continuous auscultation of the motion and positions of a patient mandible. 3,996,666, Cl. 32-19.000.

Block, Leo; and Ashton, Larry J., to Raypak, Inc. Servo modulating regulating control system. 3,997,107, Cl. 236-1.00A.

Block, Philip L.; and Derdivanis, John P. Dental plaque disclosing compositions. 3,997,658, Cl. 424-7.000.

Blue, Maurice R.; Hudson, Landon; and McCauley, Ralph G. Filtering mechanism. 3,996,640, Cl. 15-320.000.

Boatwright, William H.; and Hsu, Thomas C., to Westvaco Corporation. Black liquor oxidation apparatus. 3,997,300, Cl. 23-284.000.

Bocciarelli, Carlo V. Catalyst material, method of preparation thereof, and method and apparatus using same. 3,997,651, Cl. 423-213.200.

Bodet, Marie-Therese. Clock or calendar with removable casing. 3,996,736, Cl. 58-53.000.

Bodkin, Lawrence E. Load selective power systems. 3,997,818, Cl. 317-33.0SC.

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Boller, Arthur; and Scherrer, Hanspeter, to Hoffmann-La Roche Inc. Electro-optical cell containing dielectric isonitriles. 3,997,242, Cl. 350-160.0LC.
Boller, Arthur; Cereghetti, Marco; and Scherrer, Hanspeter, to Hoffmann-La Roche Inc. Phenyl-pyrimidines. 3,997,536, Cl. 260-251.00R.
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Bolton, Ivan Joseph; and Mercer, Alec Victor, to Sandoz Ltd. 1,3-Diphenyl pyrazolines. 3,997,556, Cl. 260-310.00D.
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Bordewick, Gerald K. Fish skinning device. 3,996,645, Cl. 17-66.000.
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Borowski, Wolfgang, to International Standard Electric Corporation. Time domain equalizer for broadband communication systems. 3,997,841, Cl. 325-42.000.
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Boutaine, Jean-Louis; Courtois, Guy; and Tanguy, Jean-Claude, to Commissariat a l'Energie Atomique. Method for testing the adhesion between the rubber compound and the cord fabric of a pneumatic tyre. 3,997,783, Cl. 250-303.000.
Boux, Rene, to C.G.R.-Mev. Device for monitoring the position, intensity, uniformity and directivity of an ionizing radiation beam. 3,997,788, Cl. 250-385.000.
Bowers, Edward Carryer, to Staffordshire Potteries (Holdings) Limited. Ceramic ware. 3,997,289, Cl. 432-241.000.
Bowmen, Mary Teresa. Stelladisk. 3,996,676, Cl. 35-44.000.
Box, E. O., Jr.; and Farha, Floyd, Jr., to Phillips Petroleum Company. Polluted water purification. 3,997,440, Cl. 210-63.00R.
Box, Theodor M. Full depth transport case having a removable side panel. 3,997,055, Cl. 206-427.000.
Boyama, Kimihiro, to Kokusan Denki Co., Ltd. Voltage regulator for a magneto AC generator. 3,997,833, Cl. 322-7.000.
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Bresin, Mark Steven, to Motorola, Inc. Self-locking electrical contact assembly. 3,997,236, Cl. 339-221.00R.
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Breton, Ernest J.; and Worden, Dexter, to Composite Sciences, Inc. Fluid processing apparatus. 3,997,447, Cl. 210-360.00A.
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Bridger, Robert F.; Heiba, El-Ahmadi I.; and Stournas, Stamoulis, to Mobil Oil Corporation. Alkali metal or tetraalkylammonium arylcarbamates. 3,997,597, Cl. 260-518.00R.
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Britton, Howard B. Strike-zone target. 3,997,158, Cl. 273-26.00A.
Broadway, William W., to FMC Corporation. Pressure sensitive and temperature responsive rotary valve. 3,997,142, Cl. 251-307.000.
Brochier, Jean, to J. Brochier & Fils; and Avions Marcel Dassault-Breguet Aviation, Societe Anonyme Francaise ayant son siege Social. Fabric with boron filaments. 3,997,697, Cl. 428-259.000.
Broeren, Johan Cornelis, to U.S. Philips Corporation. Computer configuration with claim cycles. 3,997,875, Cl. 340-172.500.
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Brown, James D.; and Uraneck, Carl A., to Phillips Petroleum Company. Organocalcium pyridine-type polymerization initiators. 3,997,708, Cl. 526-183.000.
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Bruni, James G., to Baxter Laboratories, Inc. Electronic equipment cabinet. 3,997,221, Cl. 312-294.000.
Brunner, Anton; and Bredow, Reinhard, to Siemens Aktiengesellschaft. Radar system with displaced primary and secondary radiation lobes. 3,997,897, Cl. 343-6.00R.
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Bubniak, William C.; Matthes, William R.; and Schilke, Neil A., to General Motors Corporation. Controlled exhaust gas fuel atomizing nozzle. 3,996,906, Cl. 123-119.00A.
Buchel, Karl Heinz, to Bayer Aktiengesellschaft. Chlorinated imidazole derivatives and a process for preparing them. 3,997,552, Cl. 260-309.000.
Buchman, William W., to Hughes Aircraft Company. Passive Q-switch cell. 3,997,854, Cl. 331-94.50L.
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ers, Edward Jervis, to Imperial Chemical Industries Limited. Compounds containing fluorocarbon residues and azido groups as textile-finishing agents. 3,997,571, Cl. 260-349.000.

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Buhrer, Erwin. Jet deflecting and energy dissipating pouring device. 3,997,088, Cl. 222-461.000.

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Burt, Charles M.: *See—*
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Burton, James A.: *See—*
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Buse, Kenneth E.; and Meyer, Raymond J., to Aluminum Company of America. Electrophoretic coating. 3,997,418, Cl. 204-181.000.

Busnel, Rene-Guy; and Etzold, Hellmuth. Sound absorber. 3,997,020, Cl. 181-33.00G.

Buss, Keen W. Fish husbandry system. 3,996,893, Cl. 119-3.000.

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Buzzi, Ugo, to Albe S.A. Collet chuck which can be centered relative to one or more axes of the workpiece to be machined and suitable for machine tools. 3,997,177, Cl. 279-16.000.

Bykhovsky, David Grigorievich; Medvedev, Alexandr Yakovlevich; Finkelshtein, Alexandr Yakovlevich; Bogorodsky, Jury Alexandrovich; and Zax, Mikhail Isaakovich. Method for striking main arc between the electrode of plasmatron and workpiece, and contrivance embodying same. 3,997,756, Cl. 219-121.00P.

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Call, Bruce L.: *See—*
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Callahan, Philip S., to United States of America, Agriculture. Insect antenna vibrating frequency modulator and resonating maserlike IR emitter. 3,997,785, Cl. 250-338.000.

Callen, Patrick Joseph: *See—*
Newell, Richard Abbott; Bacher, Joel Herman; Bilsky, Herbert Walter; and Callen, Patrick Joseph, 3,997,830.

Callender, George R., Jr. Fractured bone setting fastener assembly. 3,996,931, Cl. 128-92.0BA.

Calme, Edward E.; and Shakun, Wallace, to General Electric Company. Air conditioning system for a mobile home including component area access. 3,996,762, Cl. 62-237.000.

Calogero, William J.: *See—*
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Caloric Gesellschaft fur Apparatebau m.b.H.: *See—*
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Calspan Corporation: *See—*
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Cam Gears Limited: *See—*
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Campbell, John A.; Dezelan, Joseph E.; and Hart, Cullen P., to Caterpillar Tractor Co. Auxiliary hydrostatic front wheel drive system. 3,997,017, Cl. 180-44.00F.

Campbell, Robert W.: *See—*
Santucci, Lawrence E.; Campbell, Robert W.; and Woo, Gar Lok, 3,997,355.

Canadian Patents and Development Limited: *See—*
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Canathane Roller Corporation: *See—*
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Cane, David Andrew; Dutton, David Robert; and Gunther, John M., to Digital Equipment Corporation. Synchronizer circuit. 3,997,872, Cl. 340-147.0LP.

Canning, Jonathan Richard; and Wilson, Gordon Arthur, to U.S. Philips Corporation. Frequency discriminator circuit arrangement. 3,997,856, Cl. 333-17.00R.

Canon Kabushiki Kaisha: *See—*
Omi, Kokichi, 3,997,258.
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Canup, Robert E., to Texaco Inc. Means and method for controlling the occurrence and the duration of time intervals during which sparks are provided in a multicylinder internal combustion engine. 3,996,911, Cl. 123-148.00E.

Cappotto, Samuel D.; and Dodge, John E., to SCM Corporation. Pulley. 3,996,812, Cl. 74-231.00C.

Carl Zeiss-Stiftung: *See—*
Glatzel, Erhard; and Zajadatz, Heinz, 3,997,247.

Carley, Jay L.: *See—*
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Carney, Richard William James; and deStevens, George, to Ciba-Geigy Corporation. Tertiary aminoacids. 3,997,669, Cl. 424-274.000.

Caron, LaVerne Andrew; Tomczak, Lawrence William; and Crail, Frederick William, to Chrysler Corporation. Transducer circuits for providing pulses whose widths are representative of mechanical input signals. 3,997,801, Cl. 307-308.000.

Carr, Allan W., to Carrier Corporation. Mounting system of ionizing wires of electrostatic precipitator. 3,997,304, Cl. 55-147.000.

Carrier Corporation: *See—*
Carr, Allan W., 3,997,304.
Geary, Carl H., 3,997,175.
Richardson, Hubert, Jr., 3,996,761.

Caruth, Juanita W. Washer-connector service box. 3,996,959, Cl. 137-360.000.

Case, Charles B.: *See—*
Schubert, John C.; and Case, Charles B., 3,996,832.

Casey, Donald J.; and Gleckler, George C., to American Cyanamid Company. High molecular weight polyester resin, the method of making the same. 3,997,512, Cl. 260-75.00R.

Cassarino, Frank V., Jr.; Bekampis, George J.; Conway, John W.; and Lemay, Richard A., to Honeywell Information Systems, Inc. Data processing system providing split bus cycle operation. 3,997,896, Cl. 340-172.500.

Casson, Harold Vincent; Loftfield, Richard Eric; and Kindl, Bruno, to Huron Chemicals Limited. Gas concentrated and cooled electrolytic cell. 3,997,414, Cl. 204-95.000.

Cassonnet, Jean-Claude; and Milleret, Andre, to Compagnie Honeywell Bull (Societe Anonyme). Data processing system with a microprogrammed dispatcher for working either in native or non-native mode. 3,997,895, Cl. 340-172.500.

Castellion, George Augustus: *See—*
Schmitt, Joseph Lawrence, Jr.; and Castellion, George Augustus, 3,997,473.

Caterpillar Tractor Co.: *See—*
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Habiger, Cyril W.; and Spivey, William J., 3,996,743.
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Junck, John A.; and Lorimor, Larry W., 3,997,007.
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O'Neill, Frederick C.; and Sieving, Alfred W., 3,997,040.
Russey, James W., 3,997,183.
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Catterall, John Mason, to Bell Telephone Laboratories, Incorporated. Telephone station make-busy circuit. 3,997,735, Cl. 179-84.00C.

Cauldwell, Jack D., to Arvin Industries, Inc. Field strength meter. 3,996,880, Cl. 116-129.00S.

Cauley, Ronald R.; and Hoskins, William G., to 1st National Bank of Libertyville. Verification system. 3,997,871, Cl. 340-147.0MD.

Cavazzoni, Valeria: *See*—
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Caveney, Jack E., to Panduit Corporation. Cable tie and method for making same. 3,996,646, Cl. 24-16.0PB.

Cayol, Andre; Clottes, Georges; Loriot, Pierre; and Skok, Jean, to Commissariat a l'Energie Atomique. Nuclear fuel assembly. 3,997,395, Cl. 176-78.000.

Cayzac, Jacques Claude, to U.S. Philips Corporation. Method of directing an aerial to a receiver according to a main direction. 3,997,901, Cl. 343-100.0CS.

Cecil Equipment Company, The: *See*—
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Cecil, Shelby; and Riggs, Dean D., to Cecil Equipment Company, The. Proportional control for guidance systems, and the like. 3,997,757, Cl. 219-124.000.

Celanese Corporation: *See*—
Manning, Andrew J.; Saferstein, Lowell G.; and Ram, Michael J., 3,997,638.
Taylor, Paul D., 3,997,602.

Central Quality Industries, Inc.: *See*—
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Centralin Gesellschaft, Chem. Fabrik Kircher & Co.: *See*—
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Centre de Recherches Metallurgiques-Centrum voor Research in de Metallurgie: *See*—
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Centre de Recherches Scientifiques et Techniques de l'Industrie des Fabrications Metalliques, en abrege C.R.I.F.: *See*—
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Centre d'Etude de l'Energie Nucleaire, "C.E.N.": *See*—
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Century Electric Motor Co.: *See*—
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Cereghetti, Marco: *See*—
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Cession a la Societe Europeenne de Distribution Electromecanique "S.E.D.E.M.": *See*—
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Cessna Aircraft Company, The: *See*—
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Chalin, Manuel Larry, to Imperial Chemical Industries Limited. Method of dutching cocoa. 3,997,680, Cl. 426-262.000.

Chambers, Ramon P.: *See*—
Sanders, David E.; Chambers, Ramon P.; and Gordy, Robert S., 3,997,796.

Chambers, Robert B. Roller assembly. 3,997,012, Cl. 177-16.000.

Champan, Louis W., to Melco. Telephone hold attachment. 3,997,734, Cl. 179-81.00R.

Champoux, Louis A.; and Merrell, Hollis B., to Boeing Company, The. Single operation-triple cycle lockbolt setting device and system. 3,996,784, Cl. 72-391.000.

Chan, David Cheong King, to Chevron Research Company. Herbicidal N-(N'-alkynylcarbamylmethyl) 2,6-dialkyl-alpha-haloacetanilides. 3,997,326, Cl. 71-118.000.

Chan, Stephen J. C.; Henderson, Donald L., Sr.; and Baldwin, Steven M., to Burroughs Corporation. MOS integrated circuit chip for display panels. 3,997,813, Cl. 315-169.0TV.

Chantiers de l'Atlantique: *See*—
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Charpentier, Max: *See*—
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Chase-Shawmut Company, The: *See*—
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Cheever, Douglas L.: *See*—
Barr, Robert H.; Cheever, Douglas L.; and Lyons, Thomas A., 3,996,979.

Chelminski, Stephen V., to Bolt Associates, Inc. Pressurized gas discharging apparatus for use as a down-bore seismic impulse source. 3,997,021, Cl. 181-106.000.

Chemereau, Andre: *See*—
Sallenave, Guy; Chemereau, Andre; Pomies, Jean-Paul; Thomas, Georges; and Massanes, Andre, 3,996,717.

Chen, Di, to Honeywell Inc. Method of adjusting refractive index of PLZT optical coating on optical element. 3,997,690, Cl. 427-162.000.

Chen, Tien Chi; and Tung, Chin, to International Business Machines Corporation. Apparatus and machine implementable method for the dynamic rearrangement of plural bit equal-length records. 3,997,880, Cl. 340-172.500.

Chen, Wei L.: *See*—
Osofsky, Raymond C.; Marsh, David Raymond; and Chen, Wei L., 3,996,672.

Cheng, Bao-Ding, to Colgate-Palmolive Company. Detergents containing 1,2-diamino-cyclohexane-N,N,N',N'-tetraacetic acids. 3,997,481, Cl. 252-547.000.

Cherrington, Martin D., to Tidril Corporation. Method for placement of production casing under obstacle. 3,996,758, Cl. 61-105.000.

Chervenka, James, Jr.; and Heilich, Raymond P., to Aluminum Company of America. High early strength cement. 3,997,353, Cl. 106-89.000.

Chevron Research Company: *See*—
Adams, John Howard, 3,997,454.
Brown, Melancthon S., deceased; and Kohn, Gustave K., 3,997,324.
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Chicago Rawhide Manufacturing Company: *See*—
Gabrys, Kenneth F., 3,997,286.

Chika, John J. Collision deflecting system for fast moving vehicles. 3,997,209, Cl. 293-72.000.

Chin, Edward G. H.; and Schwartz, Leonard, to Singer Company, The. Four beam printed antenna for Doopler application. 3,997,900, Cl. 343-100.0SA.

Chisso Corporation: *See*—
Aruga, Shiro; Nakano, Kazuaki; and Ishibashi, Seigo, 3,997,707.

Cholet, Jacques, to Institut Francais du Petrole, des Carburants et Lubrifiants et Entreprise de Recherches et d'Activities Petrolieres Elf. Device for generating acoustic waves by implosion. 3,997,022, Cl. 181-120.000.

Christensen, Kristian Stokbro, to Ringsted Jernstoberi & Maskinfabrik A/S. Closing mechanisms for concrete containers. 3,997,087, Cl. 222-413.000.

Christman, Robert D.; McKinney, Joel D.; Readal, Thomas C.; and Yanik, Stephen J., to Gulf Research & Development Company. Hydrodesulfurization process involving blending high boiling streams. 3,997,430, Cl. 208-211.000.

Chromy, Franz, to Hilti Aktiengesellschaft. Expansion anchor. 3,996,835, Cl. 85-79.000.

Chrysler Corporation: *See*—
Caron, LaVerne Andrew; Tomczak, Lawrence William; and Crall, Frederick William, 3,997,801.
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Chubb, Talbot A. Heat energy reservoir using solid removal and gravitation settling in a molten-solid salt bath. 3,997,001, Cl. 165-94.000.

Chun, Sun W.: *See*—
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Ciba-Geigy Corporation: *See*—
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Habermeier, Jurgen, 3,997,510.
Wurster, Rudolf; and Haase, Jaroslav, 3,997,483.

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Citation Companies, The: *See*—
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Cities Service Company: *See*—
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Cities Service Oil Company: *See*—
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Claasen, Theodoor Antonius Carel Maria; Mecklenbrauker, Wolfgang Friedrich Georg; and Peek, Johannes Bernhard Heinrich, to U.S. Philips Corporation. Recursive digital filter. 3,997,770, Cl. 235-152.000.

Clark, Alfred James, to Motorola, Inc. Pushbutton assembly for a radio tuner. 3,996,805, Cl. 74-10.330.

Clark, Donald E.: *See*—
Alburn, Harvey E.; Clark, Donald E.; Grant, Norman H.; and Lapidus, Milton, 3,997,594.

Clark, Robert V.: *See*—
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Clark, William T., III. Expanding mesh catheter. 3,996,938, Cl. 128-348.000.

Clarke, Edwin E.; and Florig, Albert J., to Florig Equipment Company, Inc. Sealing hopper closure assembly. 3,997,089, Cl. 222-545.000.

Claycomb, Jackson R., to Schlumberger Technology Corporation. Well bore data-transmission apparatus. 3,997,867, Cl. 340-18.0NC.

Clean Air Company, Inc., "CASCA": *See*—
Winquist, Kurt Ludvig, 3,996,963.

Cline, Carl F.: *See*—
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Clorox Company, The: *See*—
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Clottes, Georges: *See*—
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CMI Corporation: *See—*
Swisher, George W., Jr.; Smith, Don W.; and Westphall, Gary L., 3,997,277.

Coal Industry (Patents) Limited: *See—*
Urquhart, Donald Bremner, 3,997,424.

Coirre, Bertrand: *See—*
Coirre, Paul; Coirre, Bertrand; Denis, Jean-Claude; Rambaud, Jerome; and Cahn, Jean, 3,997,559.

Coirre, Paul; Coirre, Bertrand; Denis, Jean-Claude; Rambaud, Jerome; and Cahn, Jean, to Franco Chimie S.a.r.l. N-acetyl-L-hydroxy-proline zinc salt. 3,997,559, Cl. 260-326.220.

Coker, James Newton, to Du Pont de Nemours, E. I., and Company. Melt extrudable polyvinyl alcohol compositions. 3,997,489, Cl. 260-28.5OR.

Colgate-Palmolive Company: *See—*
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Colla, Cesarina: *See—*
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Collins, Ian; and Ellis, Gwynn Pennant, to Allen & Hanburys Limited. Quinoxaline-2-carboxamidotetrazoles. 3,997,535, Cl. 260-250.00Q.

Collyer, Kervyn George: *See—*
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Cominco Ltd.: *See—*
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Commercial Solvents Corporation: *See—*
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Commissariat a l'Energie Atomique: *See—*
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Communications Satellite Corporation (Comsat): *See—*
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Compagnie Francaise d'Etudes et de Construction "Technip": *See—*
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Compagnie Generale d'Electricite: *See—*
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Compagnie Honeywell Bull (Societe Anonyme): *See—*
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Compagnie Internationale pour l'Informatique: *See—*
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Composite Sciences, Inc.: *See—*
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Concari, Franco: *See—*
Barba, Diego; Concari, Franco; and Spizzichino, Giancarlo, 3,997,408.

Cone, Eugene J., to PPG Industries, Inc. Method and apparatus for forming glass beads. 3,997,310, Cl. 65-21.000.

Confer, Robert G., to Exxon Research and Engineering Company. Method and apparatus for analyzing gaseous mixtures. 3,997,416, Cl. 23-232.00E.

Conrad, Raymond M.; and Whitcomb, Charles R. X-Ray table having collapsible guard rail. 3,997,792, Cl. 250-444.000.

Continental Can Company, Inc.: *See—*
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Contraves AG: *See—*
Schlaepfer, Hansjorg, 3,997,774.

Control Data Canada, Ltd.: *See—*
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Conway, John W.: *See—*
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Cook, Koy B., Jr., to Harris Corporation. Normally off Schottky barrier field effect transistor and method of fabrication. 3,996,656, Cl. 29-571.000.

Cooke, Ann V. Form-fitting trousers. 3,996,622, Cl. 2-227.000.

Cooke, George A.; and Houlihan, William J., to Sandoz, Inc. N-(3,4-methylenedioxy-phenyl)ureas. 3,997,564, Cl. 260-340.500.

Cooley, Earle Clifford, executor: *See—*
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Coombs, Robert V.; and Galantay, Eugene E., to Sandoz, Inc. 9-α-methyl-steroids. 3,997,574, Cl. 260-397.450.

Cooper, Eugene A., to BASF Aktiengesellschaft. Frequency modulating and demodulating method and apparatus. 3,997,915, Cl. 360-30.000.

Cooper, Julius; Snyder, Edward, III; and Ensmann, Burt, to Ideal Toy Corporation. Target game. 3,997,153, Cl. 273-121.00A.

Copal Company Limited: *See—*
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Corbin Gentry Inc.: *See—*
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Cornell Research Foundation, Inc.: *See—*
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Cornely, Kurt W.; Hindin, Saul G.; and Keith, Carl D., to Engelhard Minerals & Chemicals Corporation. Process for isomerizing alkyl benzenes. 3,997,618, Cl. 260-668.00A.

Corning Glass Works: *See—*
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Cosset, Andre: *See—*
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Costales, Rene; and Sciulli, Joseph Albert, to Communications Satellite Corporation (Comsat). Pseudo-random sequencing for speech predictive encoding communications system. 3,997,729, Cl. 179-15.0AS.

Cotton, John F.: *See—*
Wien, Raymond E.; Cotton, John F.; and Hanks, Jack G., 3,997,857.

Coultas, Dennis Keith; Keller, John Howard; and Winnard, James Robert, to International Business Machines Corporation. Method and apparatus for electrostatic deflection of high current ion beams in scanning apparatus. 3,997,846, Cl. 328-229.000.

Coupek, Jiri: *See—*
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Coxe, Weld, to Weld Incorporated. Patio housing complex. 3,996,709, Cl. 52-169.0DT.

CPC International Inc.: *See—*
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Craig, Edward P., to Keyes Fibre Company. Stacking means for packing tray. 3,997,057, Cl. 206-507.000.

Craig, Virginia L. Rinse bib construction. 3,996,946, Cl. 132-9.000.

Crall, Frederick William; and Tomczak, Lawrence William, to Chrysler Corporation. Housing for mounting electronic circuit boards on an engine air intake structure. 3,996,914, Cl. 123-198.00E.

Crall, Frederick William: *See—*
Caron, LaVerne Andrew; Tomczak, Lawrence William; and Crall, Frederick William, 3,997,801.

Craveri, Renato; Colla, Cesarina; and Cavazzoni, Valeria, to Societa' Italiana Resine S.I.R. S.p.A. Production of proteic materials from yeast cells. 3,997,397, Cl. 195-5.000.

Crawley, Lantz Stephen: *See—*
Fanshawe, William Joseph; Crawley, Lantz Stephen; Safir, Sidney Robert; Wiegand, Gretchen Ellen, deceased; and Cooley, Earle Clifford, executor, 3,997,530.

Creticos, Peter S., to Westvaco Corporation. Organometallic stabilizers for vinyl chloride polymers. 3,997,495, Cl. 260-45.75W.

Crochiere, Ronald Eldon; Rabiner, Lawrence Richard; and Shively, Richard Robert, to Bell Telephone Laboratories, Incorporated. Digital phase shifter. 3,997,772, Cl. 235-152.000.

Crock, Henry Vernon; and Pericic, Ljubomir. Securing devices and structures. 3,997,138, Cl. 248-67.500.

Crosfield Electronics Limited: *See—*
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Cross, Barrington; and Grasso, Charles Paul, to American Cyanamid Company. (Alkynyloxy)alkyl and (alkenyloxy)alkyl carbamates and their use as herbicides. 3,997,325, Cl. 71-111.000.

Crowe, William P., to General Electric Company. Refrigerator door closure apparatus. 3,996,699, Cl. 49-386.000.

Crown Cork & Seal Company, Inc.: *See—*
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Crown Recreation, Inc.: *See—*
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Crysus (Lancashire) Limited: *See—*
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Csatary, Laszlo Kalman; and Pongracz, Frank Istvan. Intra-uterine contraceptive device. 3,996,932, Cl. 128-129.000.

Cseh, Ferenc. Internal combustion engine. 3,996,903, Cl. 123-74.0AA.

Cull, Neville L., to Exxon Research and Engineering Company. Alumina treatment. 3,997,476, Cl. 252-463.000.

Cunningham, James A.; Schroeder, James E.; and Guidry, Mark Roman, to Texas Instruments Incorporated. Processes of forming insulated gate field effect transistors with channel lengths of one micron in integrated circuits with component isolated and product. 3,996,655, Cl. 29-571.000.

Currie, Gaylord Lee. Golf club with spring wing deflector. 3,997,171, Cl. 273-167.00A.

Cusic, John W.; and Levon, Ernest F., to G. D. Searle & Co. N-[2-(nitro-1-imidazolyl)ethyl]naphthal imides. 3,997,572, Cl. 260-281.0NH.

Cutchaw, John M. Connector and handling device for multilead electronic packages. 3,997,227, Cl. 339-17.0CF.

D-Cycle Associates: *See—*
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Daasvatn, Kari: *See—*
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Dabrowski, Wojciech M.; and Brown, Elwood B., to Rexnord Inc. Automatic bag strapper. 3,996,719, Cl. 53-3.000.

Daenen, Robert H. C. M., to Dart Industries Inc. Car and boat toy with removable parts. 3,996,692, Cl. 46-17.000.

Daicel, Ltd.: *See—*
Ando, Ken; Harada, Yuichi; and Ohya, Yoshinobu, 3,997,625.

Daido Metal Company, Ltd.: *See—*
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Dale, Johannes; and Daasvatn, Kari, to Dale, Johannes. Process for selective preparation of macrocyclic polyethers. 3,997,563, Cl. 260-338.000.

Daniels, Phillip D., to Novi Plastics Company. Wall paneling. 3,996,703, Cl. 52-35.000.

Dankoff, Joseph Daniel; and Snyder, David Kent. Reclamation of components from grinding swarf. 3,997,359, Cl. 134-10.000.

Dansk Industri Syndikat A/S: *See—*
Gunnergaard, Marius, 3,996,996.

Darling, Richard H.: *See—*
Kuring, Victor; Smith-Vaniz, W. R.; Carley, Jay L.; Shine, William P.; and Darling, Richard H., 3,997,384.

Dart Industries Inc.: *See—*
Daenen, Robert H. C. M., 3,996,692.
Hulyalkar, Ramchandra K.; Fein, Marvin Michael; and Vandegaer, Jan Edmond, 3,997,629.

Davidtz, John C., to Mobil Oil Corporation. Flocculation process. 3,996,696, Cl. 47-58.000.

Davie, William R., to Porter Paint Co. Method of preparing antifoulant coating compositions and resulting product. 3,997,461, Cl. 252-182.000.

Davis, Charles, Jr., to Union Carbide Corporation. Battery separators. 3,997,366, Cl. 429-144.000.

Davis, George B., Jr. Caulking gun adapter for an electric hand drill. 3,997,084, Cl. 222-326.000.

Davis, Joseph Calvin; Galiano, Francis Ross; and Hill, Robert William, to Gulf Research & Development Company. Fibril formation process. 3,997,648, Cl. 264-140.000.

Davis, Larry: *See—*
Helsley, Grover C.; Effland, Richard C.; and Davis, Larry, 3,997,557.

Davoud, John Gordon; and Burke, Jerry Allen, to D-Cycle Associates. Stirling cycle type engine and method of operation. 3,996,745, Cl. 60-517.000.

Davy International Limited: *See—*
Marsh, John, 3,996,995.

Dawson, Gary D., to Chrysler Corporation. Vacuum controls for internal combustion engines. 3,996,905, Cl. 123-119.00A.

Day, Inesis A. J.: *See—*
Sirine, Gloria F.; Day, Inesis A. J.; and Kahn, Stephen J., 3,997,460.

Dayco Corporation: *See—*
Henderson, Dewey D.; and White, Jack D., Jr., 3,996,813.

Dazey Products Company: *See—*
McNair, Samuel L., 3,997,083.

de Blois, Joffre. One-wheel skates. 3,997,179, Cl. 280-11.240.

de Bosredon, Pierre; and Cosset, Andre. Safety webbing. 3,997,189, Cl. 280-744.000.

de Bruin, Jan: *See—*
Britt, Ronald Howard; de Bruin, Jan; and Boulter, David Gordon, 3,997,153.

de Buhr, Alfred P.: *See—*
Logston, Charles F., Jr.; Meyer, Bruce R.; de Buhr, Alfred P.; and Liebenthal, Benjamin C., 3,997,822.

Decker, Hans-Heino, to Rollei-Werke Franke & Heidecke. Studio lighting system. 3,997,815, Cl. 315-241.00P.

de Crepy, Edouard, to Societe Anonyme Francaise des Appareils Automatiques, Taximeteres-Taxiphones "SAFAA". Coin telephone set. 3,997,726, Cl. 179-6.30R.

Deeg, Emil W.; Graf, Robert E.; and Krohn, David A., to American Optical Corporation. Artificial intraocular lens. 3,996,627, Cl. 3-13.000.

Deeg, Emil W.: *See—*
Krohn, David A.; Graf, Robert E.; and Deeg, Emil W., 3,997,249.
Krohn, David A.; Graf, Robert E.; and Deeg, Emil W., 3,997,250.

Deere & Company: *See—*
Termont, Charles George; and Miller, Wayne Russel, 3,996,999.
Tesch, Roger Howard, 3,997,212.

de Feo, Pio V., to Measurex Corporation. Method for producing sheet material of a desired weight per unit area. 3,997,768, Cl. 235-151.100.

Defrancq, Charles: *See—*
Van Eeghem, Jan; and Defrancq, Charles, 3,997,338.

Deknatel, Incorporated: *See—*
Kurtz, Leonard D., 3,997,458.

del Castillo, Juan M. Optical metronome. 3,996,833, Cl. 84-484.000.

del Cueto, Eusebio. Process to separate and recover the solid and liquid phases from treatment baths of hides and skins. 3,997,290, Cl. 8-94.160.

Delebecque, Robert; and Velte, Andre Jean, to Societe Anonyme de Telecommunications. Process and apparatus for finishing magnetic half-core members of the pot-core type. 3,996,700, Cl. 51-3.000.

Delente, Jacques J., to Monsanto Company. Method for the in vitro propagation and maintenance of cells. 3,997,396, Cl. 195-1.800.

Del Jiacco, Nicholas A. Apparatus for compaction baling. 3,996,849, Cl. 100-218.000.

Demag Aktiengesellschaft: *See—*
Stark, Heinz; and Konig, Heribert, 3,997,711.

Demers, Robert Richard: *See—*
Riddle, George Herbert Needham; and Demers, Robert Richard, 3,997,807.

Demetrescu, Mihai C., to Resonance Motors, Inc. Engine selectively utilizing hybrid thermodynamic combustion cycles. 3,996,915, Cl. 123-32.0SJ.

Dempster, William Boyd, to Canathane Roller Corporation. Method of rotational molding a rectangular mat. 3,997,645, Cl. 264-163.000.

Denaeyer, Jose Luis; and Kegelart, Willy, to Solvay & Cie. Sodium chlorite containing granules. 3,997,462, Cl. 252-187.00R.

Denis, Jean-Claude: *See—*
Coirre, Paul; Coirre, Bertrand; Denis, Jean-Claude; Rambaud, Jerome; and Cahn, Jean, 3,997,559.

Denis, Louis Henri Daniel; and Bedue, Abel Jean Henri, to Compagnie Francaise d'Etudes et de Construction "Technip". Method and plants for producing, storing, modulating and distributing energy. 3,996,749, Cl. 60-652.000.

Derdivanis, John P.: *See—*
Block, Philip L.; and Derdivanis, John P., 3,997,658.

Derieg, Michael Edward; Earley, James Valentine; Fryer, Rodney Ian; and Sternbach, Leo Henryk, to Hoffmann-La Roche Inc. Tricyclic benzodiazepines. 3,997,591, Cl. 260-470.000.

de Rooij, Abraham H., to Stamicarbon B.V. Recycling process for the preparation of cyclohexanone oxime. 3,997,607, Cl. 260-566.00A.

DeSchaaf, Clifford L.; and Spiegel, Ray W., to Whirlpool Corporation. Appliance door latch. 3,997,201, Cl. 292-173.000.

Deshpande, Anant S.: *See—*
Besik, Ferdinand; and Deshpande, Anant S., 3,996,862.

deStevens, George: *See—*
Carney, Richard William James; and deStevens, George, 3,997,669.

Detwiler, John H.: *See—*
Koehn, Wilbur R., deceased; Koehn, Elizabeth M., executrix; Ellenoff, Theodore, executor; and Detwiler, John H., 3,996,916.

Deutsche Gold- und Silber-Scheideanstalt vormals Roessler: *See—*
Pietka, Hans-Dieter; and Michel, Rudolf, 3,997,581.
Thurn, Friedrich; Burmester, Kurt; Pochert, Johannes; and Wolff, Siegfried, 3,997,356.

de Wit, Hendrik, to Hunter Douglas Industries B.V. Venetian blind, preferably a vertical blind. 3,996,988, Cl. 160-168.00R.

deZabala, Edward Francis: *See—*
Adams, Jim Mills; and deZabala, Edward Francis, 3,997,063.

Dezelan, Joseph E.: *See—*
Campbell, John A.; Dezelan, Joseph E.; and Hart, Cullen P., 3,997,017.

Dickerson, James P.; and Roberts, Donald L., to R. J. Reynolds Tobacco Company. Tobacco product. 3,996,940, Cl. 131-17.00R.

Dickerson, James P.: *See—*
Miller, Charles W.; Dickerson, James P.; and Rix, Charles E., 3,996,941.

Dickerson, John C.: *See—*
Partner, Harvey D.; Dickerson, John C.; and Hansen, Forrest D., 3,996,899.

Dicks, Charles E., to E. W. Bowman Incorporated. Glass annealing lehr having gas and electric heating means. 3,997,317, Cl. 65-350.000.

Digital Equipment Corporation: *See—*
Cane, David Andrew; Dutton, David Robert; and Gunther, John M., 3,997,872.

Dill, Herbert C.; and Wisler, Allen E., to Hughes Tool Company. Heat treatment of welds. 3,997,374, Cl. 148-127.000.

DiMatteo, Paul L., to Dynell Electronics Corporation. Sculpture fabricating method. 3,996,990, Cl. 164-17.000.

Djordjevich, Ljubomir. System for determining characteristics of blood flow. 3,996,925, Cl. 128-2.05V.

Dlubek, Stanislas, to Centre de Recherches Metallurgiques-Centrum voor Research in de Metallurgie. Introduction of a liquid into a receptacle such as a converter. 3,997,334, Cl. 75-60.000.

Doane, William M.: *See—*
Weaver, Mary Ollidene; Bagley, Edward B.; Fanta, George F.; and Doane, William M., 3,997,484.

Dochterman, Richard W., to General Electric Company. Resilient electric motor bearing seal. 3,997,805, Cl. 310-90.000.

Dr. -Ing. Rudolf Hell GmbH: *See—*
Bottcher, Jurgen; and Selmer, Uwe, 3,997,828.

Dr. Madaus & Co.: *See—*
Madaus, Rolf Hermann Heinrich; Halbach, Gunter; and Trost, Wilfried, 3,997,671.

Dodge, John E.: *See—*
Cappotto, Samuel D.; and Dodge, John E., 3,996,812.

Doi, Yasuhiko; Yamamoto, Shunji; Okada, Osamu; Hikosaka, Takashi; and Hayashi, Masamichi, to Minolta Camera Kabushiki Kaisha. Electrophotographic copying apparatus. 3,997,262, Cl. 355-11.000.

Dolby Laboratories, Inc.: *See—*
Gundry, Kenneth James, 3,997,850.

Dold, Edward L.: *See—*
Gitt, Edward; Ryder, Donald E.; and Dold, Edward L., 3,997,695.

Dominion Bridge Company, Limited: *See—*
Piela, Adam, 3,997,000.

Dorfer, Walter. Machine for harvesting grape-berries from grape-bunches. 3,996,730, Cl. 56-330.000.

Dormans, Paul M.: *See—*
Ricketts, Luther W.; and Dormans, Paul M., 3,997,718.

Dorr, Karl-Heinz: *See—*
Reh, Lothar; Dorr, Karl-Heinz; Grimm, Hugo; and Vydra, Karel, 3,997,655.

Dow Chemical Company, The: *See—*
Grinstead, Robert R., 3,997,599.
Van Eyck, Michael J.; and Peterson, Laurence I., 3,997,554.
Vaughn, Walter L., 3,997,500.
Walles, Wilhelm E., 3,996,725.

Dowbenko, Rostyslaw; and Hartman, Marvis E., to PPG Industries, Inc. Ambient temperature, moisture curable coating compositions which form films having excellent gloss. 3,997,485, Cl. 260-22.00S.

Downs, Ernest W. Diffuser assembly. 3,997,634, Cl. 261-122.000.

Dowse, Brian Edward Wesley, to Golder Hoek and Associates Limited. Building blocks. 3,996,715, Cl. 52-593.000.

Doyle, Timothy E.: *See—*
McCullough, George W.; McCullough, Henrietta Tragitt; and Doyle, Timothy E., 3,996,969.

Drakeley, George T., to Boeing Company, The. Fuselage tail jet engine thrust reverser. 3,997,134, Cl. 244-110.00B.

Dravo Corporation: *See—*
German, Wayne Dean, 3,996,780.

Dreisin, Alexander; and West, Floyd G., to Allis-Chalmers Corporation. Low compression ratio diesel engine. 3,996,912, Cl. 123-179.00H.

Dreyfus, Gerard; and Lewiner, Jacques, to Agence Nationale de Valorisation de la Recherche (ANVAR). Electrometer. 3,997,839, Cl. 324-109.000.

Drummond, Warren W.; and Walters, Robert H., to PPG Industries, Inc. Apparatus for gathering fibers into a plurality of spaced apart strands. 3,997,308, Cl. 65-11.00W.

Dufour, Jacques: *See—*
Bandet, Pierre; Boulassier, Roger; and Dufour, Jacques, 3,997,217.

Dugat, Pierre, to Societe d'Etudes Chimiques an abrege Socechim. Anti-mitotic and anti-gout derivatives of thiocolchicine. 3,997,506, Cl. 260-557.00B.

Dummermuth, Ernst H.: *See—*
Markley, Theodore J.; Dummermuth, Ernst H.; Searcy, William W.; and Struger, Odo J., 3,997,879.

Dunaway, Louis R., to Century Electric Motor Co. Submersible electric motor and electrical connector assembly. 3,997,232, Cl. 339-94.00R.

Dunlop Limited: *See—*
Holroyd, Eric; and Goodfellow, Anthony Gerald, 3,997,641.

Du Pont de Nemours, E. I., and Company: *See—*
Aufdermarsh, Carl Albert, Jr., 3,997,592.
Bergman, Richard C.; and Williams, Kenneth R., 3,996,968.
Coker, James Newton, 3,997,489.
Evans, Robert Franklin, 3,997,233.
Gluntz, Glenn Harlan, 3,997,228.
Hayden, Mark William; and Williams, John Francis, 3,997,105.
Jesson, James Peter; and Tolman, Chadwick Alma, 3,997,579.
Kauer, James Charles, 3,997,565.
Kogon, Irving Charles, 3,997,514.
Langsdorf, William P., 3,997,544.
Liotta, Charles Leonard, 3,997,562.
Martin, Elmore Louis, 3,997,603.
Moore, Earl Phillip, Jr.; and Bunger, Fred Lee, 3,997,486.
Rees, Richard Watkin; and Reinhardt, Hans-Georg, 3,997,487.
Schlatter, Rudolph; and Adams, Charles DeWitt, 3,997,553.
White, Donald Richard, 3,997,237.
Wu, Souheng, 3,997,694.

Duquesne, Jean F.; Rouzier, Michel M.; Revel, Maurice J.; and Louvet, Olivier F. Unit for the simultaneous switching of digital information and signalling data in P.C.M. transmission systems. 3,997,728, Cl. 179-15.0BY.

Dutton, David Robert: *See—*
Cane, David Andrew; Dutton, David Robert; and Gunther, John M., 3,997,872.

Duwel, Dieter: *See—*
Rochling, Hans; Hartel, Kurt; Kirsch, Reinhard; and Duwel, Dieter, 3,997,534.

Dwyer, Vernon Thomas. Shotshell with seed capsule. 3,996,865, Cl. 47-1.00R.

Dyna-Tech Corporation: *See—*
Moulton, Clifford H., 3,997,269.

Dynamit Nobel Aktiengesellschaft: *See—*
Lichtenberg, Hubert, 3,996,836.
Trautvetter, Werner; and Weisgerber, Gregor, 3,997,705.

Dynapar Corporation: *See—*
Willits, David L., 3,997,782.

Dynascan Corporation: *See—*
Feldman, Harold, 3,997,223.

Dynell Electronics Corporation: *See—*
DiMatteo, Paul L., 3,996,990.

Dziobkowski, Beatrice Frances; and Stiles, Gerald Earl, to American Cyanamid Company. Dry slide reagent employed in immunofluorescent test for detection of human antinuclear factor. 3,997,657, Cl. 424-3.000.

E. W. Bowman Incorporated: *See—*
Dicks, Charles E., 3,997,317.

Ealding, Cyril John; and Pears, Gordon Edmund Alfred, to Imperial Chemical Industries Limited. Coated polyester films. 3,997,701, Cl. 428-341.000.

Earle, Paul Lewis: *See—*
Tuten, Gilbert Wallace; and Earle, Paul Lewis, 3,996,716.

Earley, James Valentine: *See—*
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Eastman Kodak Company: *See—*
Bailey, David S., 3,997,342.
Hopfner, Clemens, 3,997,831.
Jackson, Brian W.; Winkler, Dean E.; and Woodworth, Charles B., 3,996,885.
Stoneham, Jeffrey Richard, 3,997,775.

Ebara Manufacturing Co., Ltd.: *See—*
Machi, Sueo; Kawamura, Keita; and Aoki, Shingi, 3,997,415.

Eberle, Marcel K., to Sandoz, Inc. 1-Dioxolanylpropyl-3-indoleacrylic acid esters. 3,997,670, Cl. 424-274.000.

Eddy, Albert W.; and Lyngklip, Roger W. Method for fabrication of communicative buttons and buttons made thereby. 3,997,052, Cl. 206-348.000.

Edgington, Geoffrey, to Lucas Industries Limited. Apparatus for indicating ice accretion. 3,996,787, Cl. 73-37.600.

Efdyn Corporation: *See—*
Schupner, Willard J., 3,997,037.

Effland, Richard C.: *See—*
Helsley, Grover C.; Effland, Richard C.; and Davis, Larry, 3,997,557.

Eggert, Hans-Joachim; Oberberger, Otto; and Zenkert, Heinrich, to Siemens Aktiengesellschaft. Housing for electrical communications and measuring devices. 3,997,819, Cl. 317-100.000.

Ehlich, Klaus-Dieter; and Lorenzen, Heinz-Christen, to Hauni-Werke Korber & Co., KG. Apparatus for reducing and equalizing localized stresses in running paper webs or the like. 3,996,842, Cl. 93-1.00R.

Eichelburg, Robert James. Cat food coated with ascomycetus or asporogenous yeasts. 3,997,675, Cl. 426-92.000.

Eichholz, Arthur H., to Central Quality Industries, Inc. Tipping force reducing apparatus. 3,996,641, Cl. 15-339.000.

Eifer, Gerd; Mahr, Rene N.; and Mailliet, Pierre, to S.A. des Anciens Etablissements Paul Wurth. Compensator connection for tuyere stock. 3,997,194, Cl. 285-53.000.

Einthoven, Willem Gerard; and Hulstrunk, William, to RCA Corporation. Semiconductor device with solder conductive paths. 3,997,910, Cl. 357-68.000.

Ekberg, Rolf, to Lawrence Peska Associates, Inc., a part interest. Press brake work piece alignment apparatus. 3,996,777, Cl. 72-36.000.

Electric Power Research Institute: *See—*
Saunders, Richard C., 3,997,363.

Electro-Food AB: *See—*
Vigerstrom, Knut Birger, 3,997,678.

Electro-Therm, Inc.: *See—*
Salinger, Fred G., 3,997,760.

Electronic Monitors, Inc.: *See—*
Basham, Raymond B., 3,996,922.

Ellenoff, Theodore, executor: *See—*
Koehn, Wilbur R., deceased; Koehn, Elizabeth M., executrix; Ellenoff, Theodore, executor; and Detwiler, John H., 3,996,916.

Elliott, James E., to MCA Disco-Vision, Inc. Focusing system for videodisc player. 3,997,715, Cl. 178-6.6DD.

Ellis, Gwynn Pennant: *See—*
Collins, Ian; and Ellis, Gwynn Pennant, 3,997,535.

Ellis Pearson & Co. Limited: *See—*
Pearson, Jonathan Clive, 3,996,711.

Elmer, Christopher: *See—*
Korsky, Viacheslav; and Elmer, Christopher, 3,997,738.

Elsasser, Heinrich: *See—*
Gottschall, Gernot; and Elsasser, Heinrich, 3,996,772.

Else, George W.: *See—*
Heisler, William C.; and Else, George W., 3,996,859.

Embury, Lloyd Elliott. Means for fabricating tapered tubing. 3,997,097, Cl. 228-7.000.

Eng, Jackson; and Gaspar, Noel J., to Exxon Research and Engineering Company. Reducing hydrogen consumption in hydrotreating petroleum fractions. 3,997,427, Cl. 208-67.000.

Engel, Wolfhard: *See—*
Seeger, Ernst; Engel, Wolfhard; Nickl, Josef; and Teufel, Helmut, 3,997,589.

Engelhard Minerals & Chemicals Corporation: *See—*
Aliotta, Joseph; and Alcuri, Louis F., 3,997,329.
Aliotta, Joseph; and Alcuri, Louis F., 3,997,330.
Cornely, Kurt W.; Hindin, Saul G.; and Keith, Carl D., 3,997,618.
Greener, Evan H., 3,997,328.
Tolliver, Albert; Aliotta, Joseph; and Alcuri, Louis F., 3,997,327.

Engineering Enterprises Inc.: *See—*
Fox, Fred K., 3,997,009.

Engineering Technology Analysts, Inc.: *See—*
Lowery, Edwin L., 3,996,754.

Ensmann, Burt: *See—*
Cooper, Julius; Snyder, Edward, III; and Ensmann, Burt, 3,997,163.

Environment Improvement Systems, Inc.: *See—*
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Environmental Research & Technology, Inc.: *See—*
Kebabian, Paul L., 3,997,240.

Eriksson, Lennart: *See—*
Fladda, Gerdt; and Eriksson, Lennart, 3,997,268.

Erwin, John R., to Garrett Corporation, The. Method and apparatus for controlling tip vortices. 3,997,132, Cl. 244-40.00R.

ESB Incorporated: *See—*
Feldhake, Ralph H., 3,997,365.

Escher Wyss Limited: *See—*
Baram, Martin, 3,997,103.
Winkler, Robert, 3,997,389.

Essex International, Inc.: *See—*
Van Sickle, James R., 3,997,861.

Estradier, Francoise: *See—*
Kalopissis, Gregoire; Bugaut, Andree; and Estradier, Francoise, 3,997,546.

Etat Francais: *See—*
Melchior, Jean, 3,996,748.

Ethyl Corporation: *See—*
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Niebylski, Leonard M., 3,996,740.
Sanders, Robert N.; and Valdo, Alex R., 3,997,340.
Sistrunk, Thomas O., 3,997,699.

Etzold, Hellmuth: *See—*
Busnel, Rene-Guy; and Etzold, Hellmuth, 3,997,020.

Eubank, Carol Hewitt; and Mimna, Charles Ronald, to Bell Telephone Laboratories, Incorporated. Pulse train analyzer. 3,997,740, Cl. 179-175.20A.

Eustace, Daniel J.; and Rao, Bhaskara M. L., to Exxon Research and Engineering Company. Polyhalide high energy density cells. 3,997,362, Cl. 429-194.000.

Evans, Dafydd W., to Towmotor Corporation. Carriage hoisting arrangement for a lift truck. 3,997,029, Cl. 187-9.00R.

Evans, Jack L.: *See—*
Schurb, Frank A.; and Evans, Jack L., 3,997,702.

Evans, Joseph H.: *See—*
Lofdahl, Clyde A.; Evans, Joseph H.; and Nyberg, Dave D., 3,996,888.

Evans, Robert Franklin, to Du Pont de Nemours, E. I., and Company. Flat conductor cable connector. 3,997,233, Cl. 339-97.00C.

Every, Robert H., Sr.; and McCabe, Edward J., to Mek-Tronix Laboratories Corporation. Call tracing and identification system. 3,997,732, Cl. 179-18.0FH.

Ex-Cell-O Corporation: *See—*
Smith, Donald E., 3,996,724.

Exxon Research and Engineering Company: *See—*
Confer, Robert G., 3,997,416.
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F. B. Mercer, Limited: *See—*
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F. L. Smidth & Co.: *See—*
Baram, Martin, 3,997,106.

Fa. Immobilien Commerce Estbl. Dr. Ivo Beck: *See—*
Schagen, Fritz, 3,996,868.

Fachbach, Heinz, to List, Hans. Quick-acting locking device for the detachable connection of a removable housing element. 3,997,203, Cl. 292-247.000.

Fagan, Castle H., to Textron, Inc. Crash attenuation landing gear. 3,997,133, Cl. 244-104.00R.

Failliot, Olivier: *See—*
Granger, Maurice; Lerond, Andre; and Failliot, Olivier, 3,996,828.

Falk, Richard A. Molten metal sampling apparatus. 3,996,803, Cl. 73-425.40R.

Fanshawe, William Joseph; Crawley, Lantz Stephen; Safir, Sidney Robert; Wiegand, Gretchen Ellen, deceased; and by Cooley, Earle Clifford, executor, to American Cyanamid Company. Substituted enaminoketones. 3,997,530, Cl. 260-240.00R.

Fanta, George F.: *See—*
Weaver, Mary Ollidene; Bagley, Edward B.; Fanta, George F.; and Doane, William M., 3,997,484.

Farha, Floyd, Jr.: *See—*
Box, E. O., Jr.; and Farha, Floyd, Jr., 3,997,440.

Faris, Charles George; and Wynne, John Gilbert, to Swiss Aluminium Limited. Method of reconditioning under-roller type wire stranders. 3,996,653, Cl. 29-401.00B.

Farnum, Eugene H.; Fries, R. Jay; Havenhill, Jerry W.; Smith, Maurice Lee; and Stoltz, Daniel L., to United States of America, Energy Research and Development Administration. Method for selecting hollow microspheres for use in laser fusion targets. 3,997,435, Cl. 209-10.000.

Fashion Optics, Inc.: *See—*
Szpur, Roman; and Holahan, James M., 3,996,947.

Faulkner, Duane Harold; Sanford, Steven Douglas; and Stanley, Herbert Meredith, to Johns-Manville Corporation. Method and apparatus for making glass fibers utilizing an oscillating spinner. 3,997,307, Cl. 65-6.000.

Fearon, Robert E.; and Scherbatskoy, Serge A., to Griffith, Bain. Apparatus and method for detecting explosives. 3,997,787, Cl. 250-359.000.

Fedders Corporation: *See—*
Gilmer, Richard W.; and Sexton, Sanford R., 3,996,764.

Feierabend, Karl; Bauder, Armin; and Zimmermann, Fritz, to Adui NSU Auto Union Aktiengesellschaft. Revolving piston combustion engine of trochoid type. 3,996,900, Cl. 123-8.090.

Fein, Marvin Michael: *See—*
Hulyalkar, Ramchandra K.; Fein, Marvin Michael; and Vandegaer, Jan Edmond, 3,997,629.

Feldhake, Ralph H., to ESB Incorporated. Battery having polyamide hot melt adhesive seal. 3,997,365, Cl. 429-185.000.

Feldman, Harold, to Dynascan Corporation. Apparatus and method for rejuvenating cathode ray tubes. 3,997,223, Cl. 316-2.000.

Ferlazzo, Natale; Buzzi, Gian Fausto; and Ghirga, Marcello, to Societa' Italiana Resine S.I.R. S.p.A. Method of preparing acrylic acid. 3,997,600, Cl. 260-530.00N.

Fernholz, Hans; Schmidt, Hans-Joachim; and Wunder, Friedrich, to Hoechst Aktiengesellschaft. Process for purifying sorbic acid. 3,997,598, Cl. 260-526.00N.

Ferranti-Packard Limited: *See—*
Smith, Charles Norman, 3,996,680.

Fey, Maurice G., to Westinghouse Electric Corporation. Process for the reduction of complex metallic ores. 3,997,333, Cl. 75-11.000.

Fiber Industries, Inc.: *See—*
Steinmiller, William G., 3,997,450.

Fickelscher, Horst, to Siemens Aktiengesellschaft. Aluminum alloy foil for high voltage electrolytic capacitors. 3,997,339, Cl. 75-138.000.

Fields, Samuel P., to Raymond Lee Organization, Inc., The, a part interest. Safety device for use in bathrooms with bathtubs. 3,996,631, Cl. 4-185.00H.

Fieldstad, Donald, Jr.; and Wandler, Donald, to McGraw-Edison Company. Luminaire optical system. 3,997,778, Cl. 240-41.35E.

Filloleau, Etienne: *See—*
Allain, Albert; Filloleau, Etienne; and Mulot, Pierre, 3,997,393.

Finike Italiana Marposs-Soc. In Accomandita Semplice di Mario Possati & C.: *See—*
Anichini, Cesare, 3,996,669.

Finkelshtein, Alexandr Yakovlevich: *See—*
Bykhovsky, David Grigorievich; Medvedev, Alexandr Yakovlevich; Finkelshtein, Alexandr Yakovlevich; Bogorodsky, Jury Alexandrovich; and Zax, Mikhail Isaakovich, 3,997,756.

Finn, Alfred C., deceased; and by Finn, Lucretta M., surviving spouse. Toy-kite airplane. 3,997,136, Cl. 244-153.00A.

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Fischer, Adolf; Koenig, Karl-Heinz; and Hamprecht, Gerhard, to BASF Aktiengeselischaft. 2,1,3-Benzothiadiazin-(4)-one-2,2-dioxides. 3,997,531, Cl. 260-243.00R.

Fischer, Earl R., to General Motors Corporation. Fuel shut-off valve assembly. 3,996,909, Cl. 123-124.00B.

Fischer, Earl R.: *See—*
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Fladda, Gerdt; and Eriksson, Lennart, to Svenska Traforskningsinstitutet. Device for determination of layer thickness, or alternatively, measurement of surface topography. 3,997,268, Cl. 356-161.000.

Fleissner, Heinz, to Vepa AG. Process for the wet treatment of lengths of printed textile material in several treatment bowls. 3,997,291, Cl. 8-137.000.

Fleming-Potter Company, Inc.: *See—*
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Flex-Kleen Corporation: *See—*
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Flores, Geraldo. Board game apparatus. 3,997,166, Cl. 273-134.00C.

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Florig, Albert J.: *See—*
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Forter, Willy; and Goldmann, Juergen, to Sandoz Ltd. Bis-(dialkoxycarbonylphenylazo)acetoacetamidoarylenes. 3,997,521, Cl. 260-176.000.

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Foster, Richard W. Instruction machine. 3,996,671, Cl. 35-8.00A.

Foster, William A., to Whitinsville Spinning Ring Company. Spinning and twister ring assembly. 3,996,732, Cl. 57-122.000.

Fougner, Sven. Purification of magnesium chloride cell bath material useful for the production of magnesium metal by electrolysis. 3,997,413, Cl. 204-70.000.

Foulletier, Louis; and Lalu, Jean-Pierre, to Produits Chimiques Ugine Kuhlmann. Mixtures of perfluoroaliphatic substituted amino compounds and the method for preparing the same. 3,997,604, Cl. 260-561.00N.

Fox, Fred K., to Engineering Enterprises Inc. Well drilling apparatus. 3,997,009, Cl. 175-107.000.

Franceschina, Louis E.; Haromy, Fred; and Kruppert, Frederick William, to Algoma Steel Corporation, Limited, The. Steel hardening method. 3,997,375, Cl. 148-143.000.

Franco Chimie S.a.r.l.: *See—*
Coirre, Paul; Coirre, Bertrand; Denis, Jean-Claude; Rambaud, Jerome; and Cahn, Jean, 3,997,559.

Frank, Ulrich Anton, to Hoffmann-La Roche Inc. Blood pressure monitor leveling device. 3,996,927, Cl. 128-2.05D.

Frantsits, Werner J. Process of producing 1-acyl-2-methyl-indolyl-3-alkanoic acids. 3,997,558, Cl. 260-326.13A.

Franz Morat GmbH, Firma: *See—*
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Fredricks, Anthony T.; and Smith, Paul F. Portable scaffold ladder. 3,997,024, Cl. 182-17.000.

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Frye, Norman V. Ground anchor for volleyball and like games. 3,996,707, Cl. 52-157.000.
Frye, Norman V. Ground anchor with looped top support. 3,996,708, Cl. 52-157.000.
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Furnier-und Sperrholzwerk J. F. Werz Jr. KG Werzalit - Pressholzwerk: *See—*
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Gale, Richard A.; and Kahl, Donald L. Rotary piston mechanism. 3,996,901, Cl. 123-8.450.
Gale, Wilfred Ernest. Metal shearing machine. 3,996,831, Cl. 83-589.000.
Galeazzi, Lucio, to Montedison Fibre S.p.A. Process for the chloromethylation of styrene-divinylbenzene copolymers. 3,997,706, Cl. 526-41.000.
Galiano, Francis Ross: *See—*
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Garrett Corporation, The: *See—*
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Partner, Harvey D.; Dickerson, John C.; and Hansen, Forrest D., 3,996,899.
Gatsis, John G.; and Tan, Gim, to Universal Oil Products Company. Process for the liquefaction of coal. 3,997,425, Cl. 208-8.000.
Geary, Carl H., to Carrier Corporation. Shaft seal assembly. 3,997,175, Cl. 277-27.000.
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Geller, Edward W.: *See—*
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Logston, Charles F., Jr.; Meyer, Bruce R.; de Buhr, Alfred P.; and Liebenthal, Benjamin C., 3,997,822.
Gentili, Vittorio. Apparatus for wrapping paper reams and the like in sheets cut off a continuous packing web and for adjusting the size of such sheets according to the ream size. 3,996,728, Cl. 53-389.000.
Geo. A. Hormel & Co.: *See—*
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George, Edward G. Football training aid. 3,997,160, Cl. 273-55.00R.
George, Kenyon P., to Varian Associates. Magnetic stirrer improvement. 3,997,272, Cl. 356-246.000.
George, Lee R. to P. R. Mallory & Co., Inc. Rotor and shaft bearing means for variable resistance control. 3,997,865, Cl. 338-174.000.

Germain, Roger Louis Elysee, to Societe Nationale d'Etude et de Construction de Moteurs d'Aviation. Stators of axial turbomachines. 3,997,280, Cl. 415-189.000.

German, Wayne Dean, to Dravo Corporation. Method and apparatus for making an improved serrated grating bar. 3,996,780, Cl. 72-187.000.

Germann, Werner, to Ananda Anlageanstalt. Ballpoint pen cartridge. 3,997,273, Cl. 401-190.000.

Gernlein, Hermann; and Wieschollek, Klaus, to Industriewerke Karlsruhe-Augsburg Aktiengesellschaft. Apparatus for controlling the operation of a package filling device. 3,997,081, Cl. 222-76.000.

Gerzon, Michael Anthony, to National Research Development Corporation. Multidirectional sound reproduction systems. 3,997,725, Cl. 179-1.0GQ.

Gestetner Copiers Limited: *See—*
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Giddings, Brandford E., to Standard Oil Company. Thermally stable high nitrile resins and method for producing the same. 3,997,628, Cl. 260-876.00R.

Gifford-Hill & Company, Inc.: *See—*
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Gigliello, Joseph F.; and Kragle, Harry A., to Corning Glass Works. Method of separating and partitioning differing density phases of a multiphase fluid. 3,997,442, Cl. 210-83.000.

Gileadi, Eliezer; and Peled, Emanuel. Electrodeposition of aluminum. 3,997,410, Cl. 204-14.00N.

Gilles, Theodore P.: *See—*
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Gitt, Edward; Ryder, Donald E.; and Dold, Edward L., to Gitco, Inc. Protective covering for fiberglass boom. 3,997,695, Cl. 428-36.000.

Glamkowski, Edward J.; and Reitano, Philip A., to American Hoechst Corporation. 3-(4-Acylaminopiperazin-1-yl alkyl)indoles, precursors and processes for the preparation thereof. 3,997,539, Cl. 260-268.0BC.

Glass Master Sales and Leasing Corporation: *See—*
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Glatzel, Erhard; and Zajadatz, Heinz, to Carl Zeiss-Stiftung. Unsymmetrical wide angle lens. 3,997,247, Cl. 350-214.000.

Glaverbel-Mecaniver S.A.: *See—*
Jacquemin, Francis; Terneu, Robert; and Voiturier, Jean-Pierre, 3,997,700.

Glazer, Ira M. Waterproof switch. 3,997,750, Cl. 200-302.000.

Gleason, John G.; Holden, Kenneth G.; and Yim, Nelson C. F., to SmithKline Corporation. Substituted glycines and intermediates thereof. 3,997,584, Cl. 260-455.00A.

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Gloor, Peter; and Berchtold, Max, to Hilti Aktiengesellschaft. Arrangement for cooling an explosive charge-driven setting gun. 3,997,096, Cl. 227-10.000.

Gluntz, Glenn Harlan, to Du Pont de Nemours, E. I., and Company. Connector for dip. 3,997,228, Cl. 339-17.0CF.

Goff, Raymon L., to TRW Inc. Fluid flow control apparatus. 3,996,742, Cl. 60-422.000.

Goff, Raymon L., to TRW Inc. Diverter valve for power steering with power beyond. 3,996,838, Cl. 91-32.000.

Goldberg, Marvin B. Golf wood, or iron, club. 3,997,170, Cl. 273-164.000.

Golder Hoek and Associates Limited: *See—*
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Goldish, Milton; and Majewski, Stanley J., to Milton Industries, Inc. Inflator valve with pressure gauge and safety regulator. 3,996,957, Cl. 137-224.000.

Goldmann, Juergen: *See—*
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Gore, William C.: *See—*
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Gorenbein, Steven M.: *See—*
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Gostomski, Victor G., Jr., to Sundstrand Corporation. Hydraulic pump or motor. 3,996,841, Cl. 91-499.000.

Goto, Junjiro: *See—*
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Gottschall, Gernot; and Elsasser, Heinrich, to Franz Morat GmbH, Firma. Method and device for the electronic control of knitting machines knitting pattern goods. 3,996,772, Cl. 66-154.00A.

Goulet, Donald E.: *See—*
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Goyal, Deepak K., to Burroughs Corporation. Content addressable memory system employing charge coupled device storage and directory registers and N/(1-H) counter refresh synchronization. 3,997,882, Cl. 340-173.0AM.

Graf, Robert E.: *See—*
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Krohn, David A.; Graf, Robert E.; and Deeg, Emil W., 3,997,250.

Graf, William Frank, Jr.: *See—*
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Granger, Maurice; Lerond, Andre; and Failliot, Olivier. Device for cutting longitudinal strips from reels of materials in strip or foil or sheet or similar form or of reduced thickness. 3,996,828, Cl. 83-500.000.

Grant, Norman H.: *See—*
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Graves, Cloise D. Retractable patio assembly for use on a pickup truck mounted camper or the like. 3,997,211, Cl. 296-23.00G.

Greco, V. Peter: *See—*
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Greene, Marvin, to Cities Service Company. Short residence time low pressure hydropyrolysis of carbonaceous materials. 3,997,423, Cl. 208-8.000.

Greener, Evan H., to Engelhard Minerals & Chemicals Corporation. Dental amalgams. 3,997,328, Cl. 75-0.50R.

Greenwell, Joseph Daniel, to R. A. Jones & Company, Inc. Article collator. 3,996,723, Cl. 53-59.00R.

Greer, Henry W.; and Martell, George E., to SmithKline Corporation. Capsule inspection machine. 3,997,058, Cl. 209-75.000.

Grego, Saverio: *See—*
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Griffin, Dana K.; and Wilson, John R. Dust mop with peel-off mop head. 3,996,639, Cl. 15-229.00B.

Griffith, Bain: *See—*
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Griffith, John Dalton; and Bidgood, Robin, to Bonas Machine Company Limited. Needle loom and method for producing knitted articles. 3,996,971, Cl. 139-431.000.

Grimes, Roger; Gardner, Kenneth John; Stowell, Michael James; and Watts, Brian Michael, to British Aluminium Company Limited, The; and T. I. (Group Services) Limited. Production of metallic articles. 3,997,369, Cl. 148-11.50R.

Grimm, Hugo: *See—*
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Grind, Robert E. Sectional boat. 3,996,634, Cl. 9-2.00S.

Grinstead, Robert R., to Dow Chemical Company, The. Extraction of carboxylic acids from dilute aqueous solutions. 3,997,599, Cl. 260-527.00R.

Groff, Eugene R., to Caterpillar Tractor Co. Track supporting roller with resilient rim. 3,996,810, Cl. 74-230.300.

Grolman, Bernard: *See—*
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Grossman, Leonard N.; and Brigham, Donald A., to General Electric Company. Dehalogenation process. 3,997,465, Cl. 252-301.10R.

Gsell, Xaver: *See—*
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GTE Automatic Electric Laboratories Incorporated: *See—*
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GTE Laboratories Incorporated: *See—*
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Guerra, Luis A. Blood taking device. 3,996,923, Cl. 128-2.00F.

Guidry, Mark Roman: *See—*
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Guillermier, Bernard. Method for drilling and tool carrier for bringing such a method into effect. 3,996,823, Cl. 82-1.00C.

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Kalinowski, David W., to Texaco Exploration Canada Ltd. Tension leg structure with riser stabilization. 3,996,755, Cl. 61-86.000.

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Kelly, Michael J.; Kobylar, Alex W.; and Pitroda, Satyan G., to GTE Automatic Electric Laboratories Incorporated. Time divided switching and concentration apparatus. 3,997,874, Cl. 340-172.500.
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King, James E. Socket wrench attachment. 3,996,819, Cl. 81-121.00R.
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Kohler, Wolfgang; and Schlundt, Dieter, 3,997,117.
Kloss, Hans-Joachim, to Julius Montz GmbH. Monofil fabric for use as a perpendicular trickle wall in exchange columns. 3,997,632, Cl. 261-103.000.
Knettig, Eva: *See—*
Zajic, James E.; and Knettig, Eva, 3,997,398.
Knodler, Diethelm: *See—*
Aisch, Friedrich-Wilhelm; Fuchs, Hans Peter; Knodler, Diethelm; Steinke, Alexander; and Steven, Josef, 3,997,394.
Knohl, Richard B.; and Zeffren, Eugene, to Procter & Gamble Company, The. Hair bleaching compositions containing an arginine compound. 3,997,659, Cl. 424-62.000.
Kobayashi, Akira: *See—*
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Kobayashi, Tamotsu: *See—*
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Kobuki, Shinzo; and Hase, Masaru, to Toyota Jidosha Kogyo Kabushiki Kaisha. Throttle positioner. 3,996,904, Cl. 123-103.00R.
Kobylar, Alex W.: *See—*
Kelly, Michael J.; Kobylar, Alex W.; and Pitroda, Satyan G., 3,997,874.
Koch, Richard L.: *See—*
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Koehn, Elizabeth M., executrix: *See—*
Koehn, Wilbur R., deceased; Koehn, Elizabeth M., executrix; Ellenoff, Theodore, executor; and Detwiler, John H., 3,996,916.
Koehn, Wilbur R., deceased; Koehn, Elizabeth M., executrix; Ellenoff, Theodore, executor; and Detwiler, John H. Rapid fire gun. 3,996,916, Cl. 124-72.000.
Koella, Ernest, III, to Rockford Manufacturing Company. Apparatus for conveying and break spinning fibers. 3,996,731, Cl. 57-58.950.
Koenig, Karl-Heinz: *See—*
Fischer, Adolf; Koenig, Karl-Heinz; and Hamprecht, Gerhard, 3,997,531.
Kogon, Irving Charles, to Du Pont de Nemours, E. I., and Company. Polyurethane elastomers having a compression set of 50 or less. 3,997,514, Cl. 260-77.5AM.

Kohler, Wolfgang; and Schlundt, Dieter, to Klockner-Humboldt-Deutz Aktiengesellschaft. Fuel injection valve for internal combustion engines. 3,997,117, Cl. 239-533.800.
Kohn, Gustave K.: *See—*
Brown, Melancthon S., deceased; and Kohn, Gustave K., 3,997,324.
Kohn, Gustave K., special administrator: *See—*
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Kojima, Makoto: *See—*
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Kokusan Denki Co., Ltd.: *See—*
Boyama, Kimihiro, 3,997,833.
Kolb, William A.; and Sigh, Jack F., to United States Steel Corporation. Method of optimum burning of carbon monoxide in a converter. 3,997,335, Cl. 75-60.000.
Kolling, Georg; and Romey, Ingo, to Bergwerksverband GmbH. Method for the production of carbonaceous articles, particularly strands. 3,997,654, Cl. 423-447.400.
Komar, Charles A., to United States of America, Energy Research and Development Administration. Method for control of subsurface coal gasification. 3,997,005, Cl. 166-251.000.
Kondo, Makoto; and Yamamoto, Kuniyuki, to Honda Giken Kogyo Kabushiki Kaisha. Power transmission device in motor vehicle. 3,997,043, Cl. 192-55.000.
Kondo, Toshio, to Aisin Seiki Kabushiki Kaisha. Disk brake assembly for use in motorcycles. 3,997,032, Cl. 188-72.400.
Konig, Heribert: *See—*
Stark, Heinz; and Konig, Heribert, 3,997,711.
Koontz, Harry S., to PPG Industries, Inc. Use of crossed electrode pairs in a glassmaking furnace. 3,997,316, Cl. 65-136.000.
Kopecek, Jinrich; Vacik, Jiri; and Sprincl, Ladislav, to Ceskoslovenska akademie ved. Soluble hydrophilic polymers and process for producing the same. 3,997,660, Cl. 424-78.000.
Korsky, Viacheslav; and Elmer, Christopher, to International Telephone and Telegraph Corporation. Line circuit for telecommunications exchange using TDM. 3,997,738, Cl. 179-99.000.
Kosaka, Kenzo; Miyamoto, Haruo; Nakagawa, Osamu; Maekawa, Susumu; Miyamatsu, Tokuhisa; and Hiromoto, Yasuhiko, to Mitsubishi Rayon Co., Ltd. Flame retardant shaped materials. 3,997,515, Cl. 260-79.30M.
Kotani, Koichi: *See—*
Murase, Michio; Sumida, Isao; and Kotani, Koichi, 3,996,790.
Kovaleski, Joseph J. Wire pay-off cap assembly. 3,997,127, Cl. 242-128.000.
Kozacka, Frederick J.; and Salzer, Erwin, to Chase-Shawmut Company, The. Labelled high-voltage fuse. 3,997,862, Cl. 337-241.000.
Kraftwerk Union Aktiengesellschaft: *See—*
Aisch, Friedrich-Wilhelm; Fuchs, Hans Peter; Knodler, Diethelm; Steinke, Alexander; and Steven, Josef, 3,997,394.
Kragle, Harry A.: *See—*
Gigliello, Joseph F.; and Kragle, Harry A., 3,997,442.
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Kratzer, Danny Alan, to Raymond Lee Organization, Inc., The. Game of track and field sports. 3,997,167, Cl. 273-134.0CA.
Krautkramer-Branson, Incorporated: *See—*
Niklas, Ludwig; Rose, Joseph L.; and Schlengermann, Udo, 3,996,791.
Kremer, Manfred, to Still GmbH (vormals SE-Fahrzeugwerke GmbH). Charge monitor for electric battery. 3,997,888, Cl. 340-249.000.
Krempp, Stanley G., to United Cabinet Corporation, The. Latching structure. 3,997,204, Cl. 292-288.000.
Krenzer, John, to Velsicol Chemical Corporation. 1-(5-T-butyl-1,3,4-thiadiazol-2-yl)-3-methyl-5-acetyloxy-1,3-imidazolidin-2-one. 3,997,321, Cl. 71-90.000.
Kritzler, Gerhard, to Apparatebau Rothemuhle Brandt & Kritzler. Device for treating gases. 3,997,294, Cl. 23-277.00C.
Krohn, David A.; Graf, Robert E.; and Deeg, Emil W., to American Optical Corporation. Ion exchangeable segment glass. 3,997,249, Cl. 351-166.000.
Krohn, David A.; Graf, Robert E.; and Deeg, Emil W., to American Optical Corporation. High strength ophthalmic lens. 3,997,250, Cl. 351-166.000.
Krohn, David A.: *See—*
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Kronogard, Sven-Olof, to United Turbine AB & Co., Kommanditbolag. Automotive gas turbine power plant. 3,997,283, Cl. 417-405.000.
Krukowski, Richard: *See—*
Brugger, Richard D.; Wager, Robert H., Jr.; and Krukowski, Richard, 3,997,271.
Kruppert, Frederick William: *See—*
Franceschina, Louis E.; Haromy, Fred; and Kruppert, Frederick William, 3,997,375.
Kubisz, Christopher Krzysztof, to Plessey Handel und Investments A.G. Record support assembly for a record player. 3,997,172, Cl. 274-10.00R.
Kubota, Jun; and Sasaki, Soji, to Hitachi, Ltd. Supersonic wave flaw detecting apparatus. 3,996,792, Cl. 73-67.80S.
Kubota Ltd.: *See—*
Tsuda, Yoshikuni; Onishi, Osamu; Mizohata, Yasuo; Ota, Ryozo; and Murakami, Hiroshi, 3,997,193.
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Kunin, Seymour L., to S.H. Kunin Felt Co., Inc. Display assembly. 3,997,060, Cl. 211-126.000.
Kunstle, Gerhard; Vornehm, Klaus; Spes, Hellmuth; and Siegl, Herbert, to Wacker-Chemie GmbH. Method for the purification of 2-aminothiazole. 3,997,550, Cl. 260-306.80R.
Kureha Kagaku Kogyo Kabushiki Kaisha: *See—*
Yoshikawa, Shinsuke; Sawa, Yuji; and Nakadai, Takeshi, 3,997,642.
Kuring, Victor; Smith-Vaniz, W. R.; Carley, Jay L.; Shine, William P.; and Darling, Richard H. System for making color-coded index tabs. 3,997,384, Cl. 156-269.000.
Kurtz, Leonard D., to Deknatel, Incorporated. Method of cleansing contaminated wounds and surgical scrub solutions for same. 3,997,458, Cl. 252-89.00R.
Kurz, German: *See—*
von Linde, Robert; von Linde, Joachim; and Kurz, German, 3,997,269.
Kusumi, Yukio: *See—*
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Ogoshi, Toshiaki; and Kusumi, Yukio, 3,997,575.
Kuwada, Yutaka; Meguro, Kanji; Sato, Yoshiaki; and Fugono, Takeshi, to Takeda Chemical Industries, Ltd. Thienopyridine-carboxylic acid derivatives. 3,997,545, Cl. 260-294.80C.
Kwan, Irene W.: *See—*
Mead, Theodore C.; Harrison, Charles W.; and Kwan, Irene W., 3,996,785.
Mead, Theodore C.; Harrison, Charles W.; and Kwan, Irene W., 3,996,786.
Kyp, Robert J. Decorative lamp having an integral base and envelope. 3,997,809, Cl. 313-160.000.
L M Ericson Pty. Ltd.: *See—*
Platts, John Charles; Geisler, Trevor Ross; Harwood, Keith; and Sheahan, Christopher Gerald, 3,997,727.
Lajoie Enterprises Ltd.: *See—*
Lajoie, Pierre A., 3,996,958.
Lajoie, Pierre A., to Lajoie Enterprises Ltd. Hydraulic valve aspirator. 3,996,958, Cl. 137-312.000.
Lalu, Jean-Pierre: *See—*
Foulletier, Louis; and Lalu, Jean-Pierre, 3,997,604.
Lamb, Bernard M., to Allied Weight System Inc. Test weight. 3,997,015, Cl. 177-264.000.
Lamb, Francis M., to Owens-Illinois, Inc. Single face web weave control. 3,997,095, Cl. 226-195.000.
Lamberti, Vincent, to Lever Brothers Company. Process of coating calcium sulfate dihydrate detergent filler particles. 3,997,692, Cl. 427-215.000.
Lamberti, Vincent, to Lever Brothers Company. Process of sizing fabrics and threads with triamides. 3,997,698, Cl. 428-262.000.
Lang, Roger D.; Thomas, Philip J.; and McAllister, John A. Mounting and contact assembly for interconnection of display and logic circuit elements in digital electronic calculators. 3,997,226, Cl. 339-17.0LM.
Langham, Stephen, to General Motors Corporation. Aircraft engine coupling. 3,997,042, Cl. 192-46.000.
Langley, Philip Edward, to Imperial Chemical Industries Limited. Adipic acid manufacture. 3,997,601, Cl. 260-531.00R.
Langsdorf, William P., to Du Pont de Nemours, E. I., and Company. Plant growth regulant carbamoylphosphonates. 3,997,544, Cl. 260-293.640.
Langstroth, Hall, to Watsco, Inc. Pressurized liquid mixer and dispenser system. 3,997,080, Cl. 222-61.000.
Lanig, Peter: *See—*
Ziegler, Gunther; and Lanig, Peter, 3,996,661.
Lapidus, Milton: *See—*
Alburn, Harvey E.; Clark, Donald E.; Grant, Norman H.; and Lapidus, Milton, 3,997,594.
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Laserplane Corporation: *See—*
Teach, Ted L., 3,997,071.
Lassen, Frederick O., to Kimberly-Clark Corporation. Method of making filaments and webs of chemically modified cellulose fibers. 3,997,647, Cl. 264-178.00F.
Latham, Raymond E.: *See—*
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Laubert, Gunter; and Ribka, Joachim, to Hoechst Aktiengesellschaft. Monoazo pigments. 3,997,523, Cl. 260-203.000.
Lauer, James L.; and Peterkin, Melvin E., to Sun Oil Company of Pennsylvania. System for spectroscopic analysis of a chemical stream. 3,997,786, Cl. 250-343.000.
Lawless, Earl E. Snagless sinker system. 3,996,689, Cl. 43-44.970.
Lawrence Peska Associates, Inc.: *See—*
Ekberg, Rolf, 3,996,777.
Isnardi, George J., 3,996,983.
Licudine, Mariano B., 3,997,115.
Lopez, Euphemia, 3,997,028.
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Le Magnesium Industriel: *See—*
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Leahy, Sidney M., to Minnesota Mining and Manufacturing Company. Coated abrasive product comprising fused zirconia grains and method for abrading iron. 3,996,702, Cl. 51-328.000.

LeBaigue, Jacques L.: *See—*
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Lee, Eugene O.: *See—*
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Lee, Herbert P. Non-scratching knife. 3,996,664, Cl. 30-286.000.

Lee Inventions, Inc.: *See—*
Lee, William Smith, 3,997,070.

Lee, William Smith, to Lee inventions, Inc. Stair landing moving method. 3,997,070, Cl. 214-152.000.

LeGrand, Jesse S., to International Telephone and Telegraph Corporation. Channeling method and apparatus. 3,997,898, Cl. 343-6.50R.

Leingang, Charles J., to Lord Corporation. Modular cushioning pad. 3,997,151, Cl. 267-152.000.

Leisure Group, Inc., The: *See—*
Baker, Richard L., 3,996,686.

Leisure Life Inc.: *See—*
Wall, Harlin J., 3,996,989.

Lemay, Richard A.: *See—*
Cassarino, Frank V., Jr.; Bekampis, George J.; Conway, John W.; and Lemay, Richard A., 3,997,896.

Lemke, Paul, Jr., to Paul Lemke Fabrik fur Sportartikel-Export. Tabletennis bat. 3,997,161, Cl. 273-76.000.

Lenke, Gerd M.; and McReynolds, Kent B., to Reichhold Chemicals, Inc. Polythiaformal compositions. 3,997,612, Cl. 260-609.00R.

Lenke, Gerd M.; and McReynolds, Kent B., to Reichhold Chemicals, Inc. Polyacetal and polyketal compositions. 3,997,613, Cl. 260-609.00R.

Lenke, Gerd M.; and McReynolds, Kent B., to Reichhold Chemicals, Inc. Polythiaformals. 3,997,614, Cl. 260-609.00R.

Lennox Industries Inc.: *See—*
Garst, Michael G.; Towe, Donald D.; Zink, Philip L.; and Gilles, Theodore P., 3,996,998.

Lerner, Julius, to Sun Oil Company of Pennsylvania. Liquid contamination detector. 3,997,886, Cl. 340-236.000.

Lerond, Andre: *See—*
Granger, Maurice; Lerond, Andre; and Failliot, Olivier, 3,996,828.

Lester, Michael George, to B.D.H. Pharmaceuticals Ltd. Keto-esters. 3,997,590, Cl. 260-470.000.

Letellier, Bernard; and Renard, Jean-Claude, to Compagnie Generale d'Electricite. Superconductive lead having thin strips. 3,997,714, Cl. 174-34.000.

Leurent, Ghislain. Opening skylight of great stability. 3,996,844, Cl. 98-42.00R.

Leva, Joseph L.: *See—*
Leva, Max; and Leva, Joseph L., 3,997,633.

Leva, Max; and Leva, Joseph L. Contact towers with leak-proof support of improved plate subassembly. 3,997,633, Cl. 261-113.000.

Lever Brothers Company: *See—*
Lamberti, Vincent, 3,997,692.
Lamberti, Vincent, 3,997,698.
Rijnten, Hendrik Theodorus; and Scherpenisse, Pieter, 3,997,475.

Lever, Ray Clarence; and Wilkus, Edward Vincent, to General Electric Company. Compounded thermoplastic polymeric materials and fillers. 3,997,494, Cl. 260-42.420.

Levesque, Charles J.: *See—*
Janowski, Kenneth R.; and Levesque, Charles J., 3,997,341.

Levine, Arnold M., to International Telephone and Telegraph Corporation. Analog-to-digital converter with electro-optical coding. 3,997,894, Cl. 340-347.0AD.

Levon, Ernest F.: *See—*
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Lewiner, Jacques: *See—*
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Lewis, J. Stephen: *See—*
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Ley, Kurt: *See—*
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Li, George S.: *See—*
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Lichtenberg, Hubert, to Dynamit Nobel Aktiengesellschaft. Apparatus for transporting and charging uncartridged explosives, more particularly plastic explosives. 3,996,836, Cl. 86-20.00C.

Licudine, Mariano B., to Lawrence Peska Associates, Inc., a part interest. Portable atomizer for liquids. 3,997,115, Cl. 239-351.000.

Liddell, Orval E. Apparatus for protecting metallic structural elements against corrosion. 3,996,757, Cl. 61-54.000.

Liebenthal, Benjamin C.: *See—*
Logston, Charles F., Jr.; Meyer, Bruce R.; de Buhr, Alfred P.; and Liebenthal, Benjamin C., 3,997,822.

Linder, Francis X.: *See—*
Taylor, William R.; Linder, Francis X.; and Clark, Robert V., 3,997,866.

Linder, Morris B. Swivel joint construction for pressure containing conduit. 3,997,198, Cl. 285-98.000.

Lindquist, Berkley James. Caulking gun. 3,997,085, Cl. 222-326.000.

Lindsay, Raymond S. W. Lawn mower and garden tool sharpener. 3,996,818, Cl. 76-82.100.

Lion Fat & Oil Co., Ltd.: *See—*
Isa, Hiroshi; Ukigai, Toshiyuki; Tominaga, Anri; and Sato, Michito, 3,997,622.
Isa, Hiroshi; Ukigai, Toshiyuki; Tominaga, Anri; and Sato, Michito, 3,997,623.
Oghoshi, Toshiaki; and Kusumi, Yukio, 3,997,576.
Ogoshi, Toshiaki; and Kusumi, Yukio, 3,997,575.

Liotta, Charles Leonard, to Du Pont de Nemours, E. I., and Company. Macrocyclic polyether/nitrile complexes. 3,997,562, Cl. 260-338.000.

Lippsmeier, Bernd; Hestermann, Klaus; and Neumaier, Hubert, to Hoechst Aktiengesellschaft. Production of tertiary phosphine oxides. 3,997,611, Cl. 260-606.50P.

List, Hans: *See—*
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Litton Systems, Inc.: *See—*
Reynolds, Richard L., 3,996,834.

Liu, Benjamin Y. H.; and Marple, Virgil A. Method and apparatus for generating dry dust particles. 3,997,433, Cl. 209-5.000.

Lock, David, to Ingersoll-Rand Company, Limited. Assembly for attachment to excavators. 3,997,068, Cl. 214-145.00A.

Locke, Werner: *See—*
Schutze, Siegfried; and Locke, Werner, 3,997,904.

Lofdahl, Clyde A.; Evans, Joseph H.; and Nyberg, Dave D., to Raychem Corporation. Cleaning and lubricating system for fusing apparatus. 3,996,888, Cl. 118-70.000.

Loftfield, Richard Eric: *See—*
Casson, Harold Vincent; Loftfield, Richard Eric; and Kindl, Bruno, 3,997,414.

Logan, Malcolm. Cutter for mats. 3,996,827, Cl. 83-455.000.

Logston, Charles F., Jr.; Meyer, Bruce R.; de Buhr, Alfred P.; and Liebenthal, Benjamin C., to General Motors Corporation. Method of controlling locomotive wheel slip. 3,997,822, Cl. 318-52.000.

Lopez, Euphemia, to Lawrence Peska Associates, Inc., a part interest. Entertainment table. 3,997,028, Cl. 186-1.00B.

Lord Corporation: *See—*
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Lorenzen, Heinz-Christen: *See—*
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Loriot, Pierre: *See—*
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Louvel, Bernard; and Vourron, Bernard, to Institut Francais du Petrole, des Carburants et Lubrifiants et Entreprise de Recherches et d'Activities Petrolieres Elf. Continuously adjusting the index of filtrability of a gas oil fraction. 3,997,432, Cl. 208-354.000.

Louvet, Olivier F.: *See—*
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Lovell, James Byron: *See—*
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Lowe, Warren: *See—*
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Lowery, Edwin L., to Engineering Technology Analysts, Inc. Mobile marine drilling unit. 3,996,754, Cl. 61-92.000.

Lubojatsky, Walter; and Wertelewski, Wilhelm, to Becorit Grubenausbau GmbH. Mine roof support. 3,996,753, Cl. 61-45.00D.

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Luce, David A., to Norlin Music, Inc. Helically wound pitch-determining element for electronic musical instrument. 3,997,863, Cl. 338-69.000.

Luperti, Harry E.: *See—*
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Lyngklip, Roger W.: *See—*
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Lyons, Thomas A.: *See—*
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Maayani, Saul: *See—*
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Mabuchi, Kenichi, to Mabuchi Motor Co. Ltd. Massaging machine. 3,996,929, Cl. 128-58.000.

Mabuchi Motor Co. Ltd.: *See—*
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Macauley, Irving P., Jr., to Jetomatic Systems, Inc. Concrete reclamation system. 3,997,434, Cl. 209-10.000.

Macchine Tessili Circolari Matec S.p.A.: *See—*
Gariboldi, Franco; and Negri, Ettore, 3,996,768.

MacDonald, Kenneth A. Cabinet door clip. 3,997,205, Cl. 292-288.000.

Machi, Sueo; Kawamura, Keita; and Aoki, Shingi, to Ebara Manufacturing Co., Ltd. Process for removing sulfur dioxide and nitrogen oxides from effluent gases. 3,997,415, Cl. 204-157.10H.

Machida, Yukihiko, to Sony Corporation. Brushless DC motor driving circuit. 3,997,823, Cl. 318-138.000.

Mackey, John: *See—*
Vorst, Carl J.; and Mackey, John, 3,996,673.

MacMillan, Kenneth T., to MacMillan Mold Company, Inc. Automatic production molds. 3,997,284, Cl. 425-23.000.

MacMillan Mold Company, Inc.: *See—*
MacMillan, Kenneth T., 3,997,284.

Madaus, Rolf Hermann Heinrich; Halbach, Gunter; and Trost, Wilfried, to Dr. Madaus & Co. Silybin polymers and therapeutic compositions. 3,997,671, Cl. 424-278.000.

Maddux, John F., to Owens-Corning Fiberglas Corporation. Glass furnace having electrically heated submerged throat and method of operation. 3,997,710, Cl. 13-6.000.

Maderna, Alfons. Underground swimming-bath. 3,996,630, Cl. 4-172.190.

Maeda, Takeo: *See—*
Miyasita, Kunio; Okuda, Hironori; Sugiura, Yasuyuki; Maeda, Takeo; Matsuda, Yasuo; and Honda, Kazuo, 3,997,825.

Maekawa, Susumu: *See—*
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Maekawa, Yukio: *See—*
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Mailliet, Pierre: *See—*
Eifer, Gerd; Mahr, Rene N.; and Mailliet, Pierre, 3,997,194.

Maine, Gayle J. Radiation shield apron construction. 3,996,620, Cl. 2-2.000.

Majewski, Stanley J.: *See—*
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Malchow, Douglas B., to Warner Manufacturing Company. Holder for detachable blades. 3,996,665, Cl. 30-331.000.

Maldonado, Paul; and Charpentier, Max, to Institut Francais du Petrole, des Carburants et Lubrifiants et Entreprise de Recherches et d'Activities Petrolieres Elf. Fermentation process for the production of citric and isocitric acids. 3,997,399, Cl. 195-29.000.

Malfroid, Pierre, to Solvay & Cie. Phosphorus-containing halogenated unsaturated polyester compositions. 3,997,509, Cl. 260-75.00T.

Malhas, Farouk S. Tennis training device. 3,997,159, Cl. 273-29.00A.

Maljushevsky, Pavel Petrovich; Gorovenko, Georgy Grigorievich; and Blagoverov, Jury Alexandrovich. Method of creating high and superhigh pressure and an arrangement for dispersing non-metalliferous materials. 3,997,468, Cl. 252-314.000.

Mallinckrodt, Inc.: *See—*
Monte, Alexander A.; and Chiang, Ching, 3,997,470.

Malz Nominees Pty. Ltd.: *See—*
Trihey, John Massey, 3,996,917.

Mammino, Joseph: *See—*
Weigl, John W.; Amidon, Alan; and Mammino, Joseph, 3,997,343.

Mancy, Denise; Ninet, Leon; and Preud'Homme, Jean, to Rhone-Poulenc S.A. Process for the preparation of daunorubicin by cultivating a streptomyces species. 3,997,661, Cl. 424-118.000.

Manitou Systems, Inc.: *See—*
Thornton, Douglas R., 3,997,873.

Mannesmann Aktiengesellschaft: *See—*
Schrewe, Hans; and Frenken, Klaus, 3,996,994.

Manning, Andrew J.; Saferstein, Lowell G.; and Ram, Michael J., to Celanese Corporation. Production of metal ion containing carbon fibers useful in electron shielding applications. 3,997,638, Cl. 264-29.700.

Marakami, Kyoichi: *See—*
Ukai, Nobuo; Ishibashi, Shingo; Tsutsumi, Toshio; and Marakami, Kyoichi, 3,997,674.

Marathe, Vijay V., to Hewlett-Packard Company. Circulating shift register incrementer/decrementer. 3,997,765, Cl. 235-92.0SH.

Marathon Oil Company: *See—*
Plummer, Mark A.; and Roszelle, Wayne O., 3,997,451.

Marble Industries Co., Ltd.: *See—*
Okubo, Yoshikazu, 3,997,180.

Marek, Miroslav; Toman, Ludek; and Pecka, Jan, to Ceskoslovenska akademie ved. Process for radiation polymerization and copolymerization of monomers with olefinic double bonds using metal halide catalysts. 3,997,417, Cl. 204-159.240.

Markley, Theodore J.; Dummermuth, Ernst H.; Searcy, William W.; and Struger, Odo J., to Allen-Bradley Company. Fault processor for programmable controller with remote I/O interface racks. 3,997,879, Cl. 340-172.500.

Marple, Virgil A.: *See—*
Liu, Benjamin Y. H.; and Marple, Virgil A., 3,997,433.

Marquardt, Erich; and Storz, Werner, to J & J Marquardt, Firma. Switches. 3,997,745, Cl. 200-76.000.

Marquez, Joseph A.: *See—*
Weinstein, Marvin J.; Wagman, Gerald H.; Testa, Raymond T.; and Marquez, Joseph A., 3,997,403.

Marquis, Edgar E., to Robertshaw Controls Company. Automatic timer switch. 3,997,742, Cl. 200-38.0FB.

Marsee, Frederick J., to Ethyl Corporation. Fuel induction system. 3,996,907, Cl. 123-122.0AC.

Marsh, David Raymond: *See—*
Osofsky, Raymond C.; Marsh, David Raymond; and Chen, Wei L., 3,996,672.

Marsh, Gerald A.; Lee, Eugene O.; Burton, James A.; and Latham, Raymond E., to HydroTech International, Inc. Ball and socket pipe coupling. 3,997,197, Cl. 285-93.000.

Marsh, John, to Davy International Limited. Continuous casting mould. 3,996,995, Cl. 164-283.00M.

Marshall, Derek: *See—*
Rhodes, William Jackson; and Marshall, Derek, 3,997,315.

Martel, Jacques; Huynh, Chanh; and Buendia, Jean, to Roussel-UCLAF. Cyclopropanecarboxylic acids and esters. 3,997,586, Cl. 260-468.00H.

Martell, George E.: *See—*
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Martienssen, Liselotte, to Hauni-Werke Korber & Co., KG. Bathing cap. 3,996,621, Cl. 2-68.000.

Martin, Alexander James: *See—*
Ritchie, David Scarth; Hamilton, James Gordon; and Martin, Alexander James, 3,997,762.

Martin, Clarence H.; and Miller, Lynn. Flag storage and display device. 3,996,882, Cl. 116-174.000.

Martin, Elmore Louis, to Du Pont de Nemours, E. I., and Company. Herbicidal halo-di-alkyl benzenesulfonamides. 3,997,603, Cl. 260-556.0AR.

Martin, Henry E.: *See—*
Games, John E.; Martin, Henry E.; and Walworth, Kirk S., 3,997,893.

Martin, Merrill D. Sheet handling apparatus. 3,997,155, Cl. 271-272.000.

Martinez-Lozano, Federico. Liquid level controlling valve. 3,996,960, Cl. 137-451.000.

Martini, Thomas; and Benninger, Siegfried, to Hoechst Aktiengesellschaft. Partially fluorinated amino ethers. 3,997,609, Cl. 260-584.00C.

Marvin Glass & Associates: *See—*
Barlow, Gordon A.; and Wildman, John R., 3,997,156.
Meyer, Burton C., 3,997,157.

Marx, Alvin J. Patient vital-signs automated measuring apparatus. 3,996,928, Cl. 128-2.05A.

Maron, George F. Automatic air flow control. 3,997,108, Cl. 237-1.00A.

Massanes, Andre: *See—*
Sallenave, Guy; Chemereau, Andre; Pomies, Jean-Paul; Thomas, Georges; and Massanes, Andre, 3,996,717.

Masuda, Takao; and Ikenoue, Shinpei, to Fuji Photo Film Co., Ltd. Method for stabilizing the image of a thermally developable photosensitive material. 3,997,346, Cl. 96-50.0PL.

Matas, Stephen J.; Mintus, Raymond E.; Ballance, John B.; and Klems, George J., to Republic Steel Corporation. High strength low alloy steel. 3,997,372, Cl. 148-36.000.

Mathieu, Francois Gaspard, to Centre d'Etude de l'Energie Nucleaire, "C.E.N.". Neutron-irradiation dose monitor comprising thermocouples. 3,997,789, Cl. 250-390.000.

Matsuda, Kazuo; Ohmura, Hidemasa; and Aritaki, Hirakazu, to Kao Soap Co., Ltd. Aqueous dispersions of amphoteric polyurethane-urea and method of making. 3,997,490, Cl. 260-29.2TN.

Matsuda, Kazuo; Ohmura, Hidemasa; and Niimi, Yukihisa, to Kao Soap Co., Ltd. Process for preparation of anionic resinous aqueous emulsions. 3,997,491, Cl. 260-29.2TN.

Matsuda, Yasuo: *See—*
Miyasita, Kunio; Okuda, Hironori; Sugiura, Yasuyuki; Maeda, Takeo; Matsuda, Yasuo; and Honda, Kazuo, 3,997,825.

Matsuda, Yoshio, to Yoshida Kogyo Kabushiki Kaisha. Warp-knitted tape for slide fasteners. 3,996,773, Cl. 66-196.000.

Matsumaru, Haruo: *See—*
Tsutsui, Ken; Sasano, Akira; Nakano, Toshio; Matsumaru, Haruo; and Nishimura, Takeo, 3,997,810.

Matsuoka, Hiromasa; and Tabata, Norikazu, to Mitsubishi Denki Kabushiki Kaisha. Gas-liquid mixing apparatus using an ejector. 3,997,631, Cl. 261-37.000.

Matsushita Electric Industrial Co., Ltd.: *See—*
Nakano, Chikao, 3,997,752.
Oka, Shunzo; and Oshima, Kazuo, 3,997,864.

Matsushita Electric Works, Ltd.: *See—*
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Matsuzawa, Nobuyoshi, to Copal Company Limited. Line printer. 3,996,852, Cl. 101-93.310.

Mattel, Inc.: *See—*
Sapkus, Jurgis; and Lewis, J. Stephen, 3,996,695.

Matthes, William R.: *See—*
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Max-Planck-Gesellschaft zur Forderung der Wissenschaften e.V.: *See—*
Rabl, Carl-Roland, 3,997,779.

Mayer, Ferdy. Speed limit passing indicator. 3,997,869, Cl. 340-62.000.

Mayer, Raymond E. Display units. 3,997,220, Cl. 312-242.000.

Mayer, Robert, to Sun Oil Company of Pennsylvania. Valve operator circuit with provision for presetting. 3,997,826, Cl. 318-207.00R.

Maytag Company, The: *See—*
McNally, William J., 3,997,751.

Mazaki, Shiro: *See—*
Noda, Yuzuru; Kojima, Makoto; Mazaki, Shiro; and Katashiba, Yasutada, 3,997,513.

MCA Disco-Vision, Inc.: *See—*
Elliott, James E., 3,997,715.

McAllister, John A.: *See—*
Lang, Roger D.; Thomas, Philip J.; and McAllister, John A., 3,997,226.

McCabe, Edward J.: *See—*
Every, Robert H., Sr.; and McCabe, Edward J., 3,997,732.

McCanse, James Edson; and Sevick, Timothy A., to Hesston Corporation. Round bale hauler and unroller. 3,997,069, Cl. 214-147.00G.
McCauley, Ralph G.: *See—*
Blue, Maurice R.; Hudson, Landon; and McCauley, Ralph G., 3,996,640.
McClure, Stewart. Ornament and method of manufacture. 3,997,686, Cl. 427-4.000.
McCombs, Howard L., to Bendix Corporation, The, South Bend 4 IN. Control apparatus particularly for a plurality of compressor bleed valves of a gas turbine engine. 3,996,964, Cl. 137-608.000.
McCullough, George W.; McCullough, Henrietta Tragitt; and Doyle, Timothy E., to McCullough, George W.; and McCullough, Henrietta Tragitt. Adjustable loom. 3,996,969, Cl. 139-29.000.
McCullough, Henrietta Tragitt: *See—*
McCullough, George W.; McCullough, Henrietta Tragitt; and Doyle, Timothy E., 3,996,969.
McDonnell Douglas Corporation: *See—*
Vorst, Carl J.; and Mackey, John, 3,996,673.
McDowell, James A. Extinguisher for cigarettes or cigars. 3,996,945, Cl. 131-235.00R.
McFarland, James W.; and Thomson, Colin, to Pfizer Inc. Aminomethylarylmethylpenicillin derivatives. 3,997,527, Cl. 260-239.100.
McGivern, Robert F., to Sybron Corporation. Sewage settling tank. 3,997,444, Cl. 210-242.00R.
McGraw-Edison Company: *See—*
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Irelan, Edward A.; and Annis, Larry D., 3,996,729.
McIlvried, Howard G.: *See—*
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McIntire, William S.: *See—*
Brewer, Arthur D.; Neidermyer, Robert W.; and McIntire, William S., 3,997,323.
McKeever, Carl W., to Lyall Electric, Inc. Apparatus for making lengths of flexible material. 3,996,826, Cl. 83-208.000.
McKenna, George E., to Phillips Petroleum Company. Vaporization of oil feed by addition of regenerated catalyst. 3,997,428, Cl. 208-78.000.
McKinney, Joel D.: *See—*
Christman, Robert D.; McKinney, Joel D.; Readal, Thomas C.; and Yanik, Stephen J., 3,997,430.
McLafferty, Fred W.; and Baldwin, Michael A., to Cornell Research Foundation, Inc. Liquid chromatography-mass spectrometry system and method. 3,997,298, Cl. 23-253.00R.
McLeod, Gordon D., to Mobil Oil Corporation. Polyol-silicate ester-exchange reaction product. 3,997,501, Cl. 260-37.0SB.
McNair, Samuel L., to Dazey Products Company. Shaving lather heater and dispenser having heat storing element. 3,997,083, Cl. 222-146.0HA.
McNally, William J., to Maytag Company, The. Access door latch mechanism. 3,997,751, Cl. 200-61.620.
McNeill, William Henry: *See—*
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McReynolds, Kent B.: *See—*
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Lenke, Gerd M.; and McReynolds, Kent B., 3,997,613.
Lenke, Gerd M.; and McReynolds, Kent B., 3,997,614.
Mead Corporation, The: *See—*
Parsonage, Harry N., 3,997,347.
Mead, Theodore C.; Harrison, Charles W.; and Kwan, Irene W., to Texaco Inc. Means for on-line determination of boiling point properties of crude oil. 3,996,785, Cl. 73-17.00A.
Mead, Theodore C.; Harrison, Charles W.; and Kwan, Irene W., to Texaco Inc. Means for on-line determination of boiling point properties of crude oil. 3,996,786, Cl. 73-17.00A.
Measurex Corporation: *See—*
de Feo, Pio V., 3,997,768.
Mecklenbrauker, Wolfgang Friedrich Georg: *See—*
Claasen, Theodoor Antonius Carel Maria; Mecklenbrauker, Wolfgang Friedrich Georg; and Peek, Johannes Bernhard Heinrich, 3,997,770.
Meckler, Milton. Environment assisted hydronic heat pump system. 3,996,759, Cl. 62-2.000.
Medtronic, Inc.: *See—*
Birnbaum, Michael R., 3,996,926.
Medvedev, Alexandr Yakovlevich: *See—*
Bykhovsky, David Grigorievich; Medvedev, Alexandr Yakovlevich; Finkelshtein, Alexandr Yakovlevich; Bogorodsky, Jury Alexandrovich; and Zax, Mikhail Isaakovich, 3,997,756.
Meguro, Kanji: *See—*
Kuwada, Yutaka; Meguro, Kanji; Sato, Yoshiaki; and Fugono, Takeshi, 3,997,545.
Mehta, Nariman Bomanshaw; and Brieaddy, Lawrence Edward, to Burroughs Wellcome Co. O [(O-piperazinocarbonyl-phenyl)-thio]-benzoates. 3,997,540, Cl. 260-268.00C.
Meier, Franz, to Ruti Machinery Works Ltd. Elastic shuttle for looms. 3,996,970, Cl. 139-196.100.
Mek-Tronix Laboratories Corporation: *See—*
Every, Robert H., Sr.; and McCabe, Edward J., 3,997,732.
Melchior, Jean, to Etat Francais. Supercharged internal combustion engines. 3,996,748, Cl. 60-614.000.
Melchior, Jean F., to French State, The. Compression-ignition internal combustion engine and method of supercharging such engine. 3,996,747, Cl. 60-606.000.
Melco: *See—*
Champan, Louis W., 3,997,734.
Melton, Donald F.; and Neumeier, Karl E., to Programmed & Remote Systems Corporation. Sealing cover for containers for hazardous materials. 3,997,078, Cl. 220-315.000.
Menon, Sukumaran K.; and Hutton, James E., to Xerox Corporation. Platen cover. 3,997,265, Cl. 355-75.000.
Mercer, Alec Victor: *See—*
Bolton, Ivan Joseph; and Mercer, Alec Victor, 3,997,556.
Mercer, Frank Brian, to F. B. Mercer, Limited. Commodity packaging. 3,996,721, Cl. 53-27.000.
Merit Plastics, Inc.: *See—*
Bartholomew, Donald D., 3,997,195.
Merrell, Hollis B.: *See—*
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Merriken, Lyal N.: *See—*
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Merritt Foods Company: *See—*
Bair, Sydney L., Jr., 3,996,760.
Meserole, Robert Henry, to Johns-Manville Corporation. Method and apparatus for reforming round ducts into rectangular ducts. 3,996,783, Cl. 72-370.000.
Messman, Leonard A., to United Technologies Corporation. Container orientation system cursor and processing. 3,997,781, Cl. 250-223.00R.
Met, Viktor, to Micro-Grade Laser Systems. Laser apparatus for projecting a narrow beam of light as a reference line. 3,997,267, Cl. 356-138.000.
Metacon A.G.: *See—*
Tinnes, Bernhard, 3,997,090.
Metal Box Limited: *See—*
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Metallgesellschaft Aktiengesellschaft: *See—*
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Meyer, Bruce R.: *See—*
Logston, Charles F., Jr.; Meyer, Bruce R.; de Buhr, Alfred P.; and Liebenthal, Benjamin C., 3,997,822.
Meyer, Burton C., to Marvin Glass & Associates. Competitive skill-type game. 3,997,157, Cl. 273-1.00R.
Meyer, Raymond J.: *See—*
Buse, Kenneth E.; and Meyer, Raymond J., 3,997,418.
Meyer, Wolfgang: *See—*
Schneider, Kurt; Vogel, Helmut; Meyer, Wolfgang; and Brassat, Bert, 3,997,646.
Mezrich, Reuben Saul; and Vilkomerson, David Herman Raphael, to RCA Corporation. Ultrasonic wave radiation pattern display system incorporating phase contrast means. 3,997,717, Cl. 178-6.800.
Mezzacapo, Filippo. Device for improving the adhesion of the wheels of a vehicle. 3,996,984, Cl. 152-225.00R.
Miale, Joseph N.; and Olson, David H., to Mobil Oil Corporation. Activation of ferrierite. 3,997,474, Cl. 252-450.000.
Michel, Rudolf: *See—*
Pletka, Hans-Dieter; and Michel, Rudolf, 3,997,581.
Michelson, Adolf Michael, to Agence Nationale de Valorisation de la Recherche (ANVAR). Superoxide dismutase and process for production. 3,997,402, Cl. 195-62.000.
Michigan Chemical Corporation: *See—*
Albright, James A., 3,997,505.
Wilkinson, Theodore C., 3,997,449.
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Midway Fishing Tool Company: *See—*
Rilling, Harry Lee, 3,997,010.
Mier, Randall. Obstacle detection device for use by the blind. 3,996,950, Cl. 135-66.000.
Mihalik, Nandor; and Frostick, Terence Cunningham, to Gestetner Copiers Limited. Improvements in or relating to scanning lens systems for electrostatic copying machines. 3,997,260, Cl. 355-8.000.
Mill, Patrick J.; and Walkley, John C., to G. D. Searle & Co. Ltd. Containers with screw caps. 3,997,077, Cl. 220-288.000.
Miller, Charles W.; Dickerson, James P.; and Rix, Charles E., to R. J. Reynolds Tobacco Company. Tobacco product. 3,996,941, Cl. 131-17.00R.
Miller, Gerald K., to Nartron Corporation. Intermittent load energizer assembly. 3,997,859, Cl. 335-128.000.
Miller, Lynn: *See—*
Martin, Clarence H.; and Miller, Lynn, 3,996,882.
Miller, Walter L., to Butler Manufacturing Company. Drive chain having a disengaging link. 3,996,809, Cl. 74-229.000.
Miller, Warren V., to Spex Industries Inc. Primary standards. 3,997,296, Cl. 23-232.00R.
Miller, Wayne Russel: *See—*
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Mimna, Charles Ronald: *See—*
Eubank, Carol Hewitt; and Mimna, Charles Ronald, 3,997,740.

Minagawa, Motonobu; Akutsu, Mitsuo; and Nakagawa, Kenichi, to Argus Chemical Corporation. 3-Salicylamido-s-triazoles. 3,997,551, Cl. 260-308.00R.

Mine, Yasuharu: *See—*
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Minesaki, Ichihito: *See—*
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Mishra, Anil K., to Westinghouse Electric Corporation. Rotor member for dynamoelectric machines with longitudinal passages of decreasing area communicating with radial core vents. 3,997,803, Cl. 310-59.000.

Mitchell, George A. Magazine camera. 3,997,251, Cl. 352-72.000.

Mitchell, Roger R., to Caterpillar Tractor Co. Force transmitting connection. 3,997,275, Cl. 403-14.000.

Mitsubishi Denki Kabushiki Kaisha: *See—*
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Mitsubishi Jidosha Kogyo Kabushiki Kaisha: *See—*
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Mitsubishi Jukogyo Kabushiki Kaisha: *See—*
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Mitsubishi Rayon Co., Ltd.: *See—*
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Mitsui Toatsu Chemicals, Incorporated: *See—*
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Miyamatsu, Tokuhisa: *See—*
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Miyamoto, Keiji: *See—*
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Miyasita, Kunio; Okuda, Hironori; Sugiura, Yasuyuki; Maeda, Takeo; Matsuda, Yasuo; and Honda, Kazuo, to Hitachi, Ltd. Method and apparatus for controlling synchronous motor. 3,997,825, Cl. 318-171.000.

Miyazaki, Hachiro. Apparatus for molding an extruded product containing a reinforcing material. 3,997,285, Cl. 425-113.000.

Miyazaki, Sadao: *See—*
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Mizoguchi, Hiroaki: *See—*
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Mizohata, Yasuo: *See—*
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Mobil Oil Corporation: *See—*
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Mochizuki, Kazunori: *See—*
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Modular Systems, Inc.: *See—*
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Moen, Alfred M., to Stanadyne, Inc. Adjustable shower head. 3,997,116, Cl. 239-460.000.

Mol, Hans C., to Pitney-Bowes, Inc. Stacking system for a rotary drum collator. 3,997,154, Cl. 271-215.000.

Moliner, Jose Gasulla; and Rivas, Amador Royo, to "OGIPSA" Oleoductos, Gaseoductos e Instalaciones Petroliferas, S.A. Process for the manufacture of a heat exchange tube with surfaces provided of radial welded studs. 3,997,754, Cl. 219-99.000.

Moliner, Jose Gasulla; and Rivas, Amador Royo, to "OGIPSA" Oleoductos, Gaseoductos e Instalaciones Petroliferas, S.A. Electrode specially for welding studs in heat exchanger tubes. 3,997,755, Cl. 219-120.000.

Molitorisz, Joseph. Rotary compacting machine for fibrous material. 3,996,848, Cl. 100-73.000.

Mollerstedt, Karl Allan Bonde, to IFO AB. Water closets. 3,996,628, Cl. 4-26.000.

Molnlycke AB: *See—*
Widlund, Leif Urban Roland; Bergdahl, Sven Gunnar; and Strandberg, Kerstin Anna Helena, 3,996,936.

Monarch Marking Systems, Inc.: *See—*
Pabodie, Robert M., 3,996,855.

Monnet, Francois, to Cession a la Societe Europeenne de Distribution Electromecanique "S.E.D.E.M.". Automatic pressure regulator. 3,996,954, Cl. 137-116.300.

Monsanto Company: *See—*
Delente, Jacques J., 3,997,396.
Morgan, Albert W.; and Ribaudo, Roland G., 3,997,493.

Montagna, Angelo A.; and McIlvried, Howard G., to Gulf Research & Development Company. Process for the conversion of carbonaceous materials. 3,997,426, Cl. 208-10.000.

Montagna, Angelo A.: *See—*
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Montagnat, Paul Kemp: *See—*
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Monte, Alexander A.; and Chiang, Ching, to Mallinckrodt, Inc. Surfactant containing reagent formulations for assaying biological specimens and methods of preparing same. 3,997,470, Cl. 252-408.000.

Montedison Fibre S.p.A.: *See—*
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Galeazzi, Lucio, 3,997,706.

Moore, Earl Phillip, Jr.; and Bunger, Fred Lee, to Du Pont de Nemours, E. I., and Company. Preparation of polymeric chromium complexes. 3,997,486, Cl. 260-23.0CP.

Morehouse, Edward L., to Union Carbide Corporation. Silicone sulfates. 3,997,580, Cl. 260-448.20N.

Morgan, Albert W.; and Ribaudo, Roland G., to Monsanto Company. High flash point oil-extended rubber. 3,997,493, Cl. 260-29.7GP.

Morgan, W. F. Retractable auxiliary support for trailers. 3,997,191, Cl. 280-763.000.

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Bresin, Mark Steven, 3,997,236.
Clark, Alfred James, 3,996,805.
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Moulton, Clifford H., to Dyna-Tech Corporation. Scaling apparatus with linearization compensation. 3,997,269, Cl. 356-167.000.

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Murata, Zenichi, to Sony Corporation. Apparatus for transporting successive printed circuit boards to and from a work station. 3,997,067, Cl. 214-8.50K.
Murphy, Richard J., to Xerox Corporation. Fusing surface and method for fixing toner. 3,997,691, Cl. 427-195.000.
Murray, Charles T., to TRI Research Corporation. Wrench adapter kit for by-passing obstructions. 3,996,821, Cl. 81-177.00A.
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Nafziger, Ralph H.; and Armantrout, Clo E., to United States of America, Interior. Steelmaking by the electroslag process using prereduced iron or pellets. 3,997,332, Cl. 75-10.00R.
Nagabhushan, Tattanahalli Lakshminarayan, to Schering Corporation. Process for the manufacture of 6'-N-alkyl derivatives of sisomicin and verdamicin; novel intermediates useful therein, and novel 6'-N-aikylverdamicins prepared thereby. 3,997,524, Cl. 536-17.000.
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Nagakura, Masatsugu. Filter apparatus with an accordion-type filter medium for compaction and removal of sludgy filter cake. 3,997,446, Cl. 210-350.000.
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Nash, Harold Garth, to Motorola, Inc. Digital FSK time rate of change modulator. 3,997,855, Cl. 332-9.00R.
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Neuzil, Richard W., to Universal Oil Products Company. Process for the separation of ethylbenzene. 3,997,619, Cl. 260-674.0SA.
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Newell, Richard Abbott; Bacher, Joel Herman; Bilsky, Herbert Walter; and Callen, Patrick Joseph, to RCA Corporation. Satellite battery reconditioning system and method. 3,997,830, Cl. 320-5.000.
Newton, Charles L., to Air Products and Chemicals, Inc. Liquid-gas phase separator having a perforated plate and mist eliminator pad. 3,997,303, Cl. 55-97.000.
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Niemann, Wolfgang. Automatic inflating device for lifesaving devices. 3,997,079, Cl. 222-5.000.
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Niklas, Ludwig; Rose, Joseph L.; and Schlengermann, Udo, to Krautkramer-Branson, Incorporated. Ultrasonic test method and apparatus utilizing scattered signals. 3,996,791, Cl. 73-67.700.
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Nishimura, Osamu, to Takeda Chemical Industries, Ltd. Method for protecting guanidino group and restoring the same. 3,997,516, Cl. 260-112.50R.
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Noguchi, Masaaki; Tanaka, Yukiyasu; and Tanaka, Taro, to Nippon Soken, Inc. Fuel injection system for internal combustion engine. 3,996,910, Cl. 123-139.0AW.

Noguchi, Yoshiro; and Maekawa, Yukio, to Minolta Camera Kabushiki Kaisha. Enlarging lens barrel. 3,997,264, Cl. 355-61.000.

Noiles, Douglas G., to United States Surgical Corporation. Prosthetic knee joint. 3,996,624, Cl. 3-1.911.

Noiles, Douglas G., to United States Surgical Corporation. Artificial hip joint with novel stem. 3,996,625, Cl. 3-1.912.

Nolan, Charles J.; and Greco, V. Peter, to United States of America, Army. Method for electroplating extrusion-resistant lead coatings on uranium and the alloys thereof. 3,997,409, Cl. 204-1.500.

Nomiyama, Tetsuo. Angular impact absorbing device. 3,997,208, Cl. 293-71.00R.

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Oger, Jacques, to Pont-A-Mousson S.A. Casing panel. 3,996,752, Cl. 61-45.00R.

Oghoshi, Toshiaki; and Kusumi, Yukio, to Lion Fat & Oil Co., Ltd. Method for preparation of α-sulfofatty acid ester. 3,997,576, Cl. 260-410.90R.

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Moliner, Jose Gasulla; and Rivas, Amador Royo, 3,997,755.

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Osborne, Richard F., to W. R. Grace & Co. Clamping of film-like material for radiant energy welding. 3,997,385, Cl. 156-272.000.

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Otten, Horst; Frenken, Hans; Bussmann, Heinrich; and Voss, Karl, to AGFA-Gevaert, A.G. Apparatus for coating web-form substrates with liquid solution or dispersions. 3,996,889, Cl. 118-126.000.

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Padula, William V.; and Serensen, William, Jr., to United States of America, Army. Jungle penetration munition. 3,996,857, Cl. 102-7.200.

Paige, David L. Ring and cord puzzle. 3,997,168, Cl. 273-159.000.

Paitula, Hannu: *See—*
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Pajak, Robert A.; and Porter, Richard B., to Honeywell Inc. Shaded pole electric motor and brake. 3,997,827, Cl. 318-212.000.

Pallari, Kyosti. Clearing machine for brushwood. 3,996,980, Cl. 144-34.00E.

Pamplin, Lee F., Jr. Pressure filter separator. 3,997,441, Cl. 210-75.000.

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Pardes, Herman I.; and Schwartz, Joseph R., to United States of America, Army. Distribution of fire display technique for moving target screens. 3,996,674, Cl. 35-25.000.

Parisien, Rudolph E. Gate. 3,997,144, Cl. 256-32.000.

Parker, Delmer G.; and Scaletta, Joseph L., to Xerox Corporation. Spatially programmable electrode-type roll for electrostatographic processors and the like. 3,996,892, Cl. 118-658.000.

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Parker Manufacturing Co.: *See—*
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Porter, L. Steven, 3,997,279.

Parker, Shirley L.; and Rohrer, John D., to Parker Industries, Inc. Gravity bed trailer. 3,997,215, Cl. 298-24.000.

Parr, Erwin W.; and Brandt, Timothy B., to Parr Manufacturing Inc. Safety roll over valve. 3,996,951, Cl. 137-43.000.

Parr Manufacturing Inc.: *See—*
Parr, Erwin W.; and Brandt, Timothy B., 3,996,951.

Parrilla, Salvatore C. Bicycle frame. 3,997,185, Cl. 280-289.00G.

Parry, David Rees; and Williams, Alfred Glyn, to Imperial Chemical Industries Limited. Process of preparing 2-amino-4-hydroxy-5(and-/or 6)-alkyl substituted pyrimidines. 3,997,537, Cl. 260-256.40C.

Parsonage, Harry N., to Mead Corporation, The. Method and apparatus for recycling photographic wash water. 3,997,347, Cl. 96-50.00R.

Partner, Harvey D.; Dickerson, John C.; and Hansen, Forrest D., to Gateway of Discovery, Inc. Positive displacement continuous combustion engine. 3,996,899, Cl. 123-8.250.

Patel, Neville K., to Westinghouse Electric Corporation. Moisture control device for steam turbines. 3,997,758, Cl. 219-201.000.

Patterson, Allen S.; and Trikilis, Emanuel M. Ladder. 3,997,027, Cl. 182-195.000.

Patterson, Chad W. Jewelry caddy. 3,997,050, Cl. 206-75.000.

Paul Lemke Fabrik fur Sportartikel-Export: *See—*
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Payot, Henri M., to Lawrence Peska Associates, Inc., a part interest. Self contained film strip display apparatus. 3,997,253, Cl. 352-72.000.

Pears, Gordon Edmund Alfred: *See—*
Ealding, Cyril John; and Pears, Gordon Edmund Alfred, 3,997,701.

Pearson, David B., to Weston Instruments, Inc. Panel meter with adapter cover. 3,997,840, Cl. 324-156.000.

Pearson, Jonathan Clive, to Ellis Pearson & Co. Limited. Walls. 3,996,711, Cl. 52-207.000.

Pecka, Jan: *See—*
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Peddinghaus, Rolf: *See—*
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Peek, Johannes Bernhard Heinrich: *See—*
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Pelosi, Stanford S., Jr., to Morton-Norwich Products, Inc. 3'-Chloro-4'- thiocyanatohydrocinnamanilide. 3,997,583, Cl. 260-454.000.

Pennebaker, William Boone, Jr., to International Business Machines Corporation. High frequency alternating field charging of aerosols. 3,997,113, Cl. 239-15.000.

Pentaco Enterprises Corporation: *See—*
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Pericic, Ljubomir: *See—*
Crock, Henry Vernon; and Pericic, Ljubomir, 3,997,138.

Perlowski, Andrew A.; Wallace, Robert H.; and Magers, Robert L., to Honeywell Inc. Apparatus and method for performing an arithmetic operation and multibit shift. 3,997,771, Cl. 235-156.000.

Perri, Roland; and Heinrick, Leonard J., to Cominco Ltd. Top-mounted anode spacer clip. 3,997,421, Cl. 204-267.000.

Perriman, Michael J.; Gascoigne, Richard M.; and Pugsley, Peter C., to Crosfield Electronics Limited. Screened image reproduction. 3,997,911, Cl. 358-75.000.

Perry, David H., deceased: *See—*
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Peters, Charles Allan; and Hurd, Richard Nelson, to Commercial Solvents Corporation. Conversion of (10'S)-zearalenone to (10'R)-zearalanone. 3,997,568, Cl. 260-343.20F.

Peters, Clifford M. Pilot valve mechanism for high or low pressure cutoff control. 3,996,965, Cl. 137-625.660.

Petersen, Uwe: *See—*
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Peterson, Curfield. Maneuverable auxiliary vehicle. 3,997,135, Cl. 244-137.00R.

Peterson, Frank C.: *See—*
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Peterson, Laurence I.: *See—*
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Petro, Jozsef, to Budapesti Muszki Egyetem. Promted Raney-nickel catalysts. 3,997,478, Cl. 252-470.000.

Petroff, Pierre Marc; and Rozgonyi, George Arthur, to Bell Telephone Laboratories, Incorporated. Elimination of stacking faults in silicon devices: a gettering process. 3,997,368, Cl. 148-1.500.

Petrolite Corporation: *See—*
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Pexa, Guenther, to Siemens Aktiengesellschaft. Method and apparatus for monitoring modulation devices for video signals. 3,997,842, Cl. 325-67.000.

Pfizer Inc.: *See—*
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Phelps, Gary M. Jewelry cabinet. 3,997,219, Cl. 312-234.000.

Phillips, Kevin John, to RCA Corporation. Minimization of residual spacecraft nutation due to disturbing torques. 3,997,137, Cl. 244-169.000.

Phillips Petroleum Company: *See—*
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Brown, James D.; and Uraneck, Carl A., 3,997,708.
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Phillips, William, to RCA Corporation. Method of preparing optical waveguides. 3,997,687, Cl. 427-12.000.

Picunko, Thomas; and Larrabee, Edward Whittum, to Union Carbide Corporation. Automatic apparatus for dispensing radiodiagnostic agents and method therefor. 3,997,784, Cl. 250-328.000.

Piela, Adam, to Dominion Bridge Company, Limited. Mechanical cleaning device for boilers with gas flow containing sticky dust. 3,997,000, Cl. 165-84.000.

Pierrefitte-Auby: *See—*
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Pilkington Brothers Limited: *See—*
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Pinchot, Gifford, III. Hydrofoil vessel. 3,996,872, Cl. 114-66.50H.

Pinnert, Sylvie; Ninet, Leon; and Preud'Homme, Jean, to Rhone-Poulenc S.A. Antibiotics and their preparation. 3,997,662, Cl. 424-119.000.

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Pinto, Noel John: *See—*
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Pioneer Electronic Corporation: *See—*
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Pitney-Bowes, Inc.: *See—*
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Pivar, Stewart, to Rototron Corporation. Method of rotational molding a hollow article. 3,997,649, Cl. 264-310.000.

Pivette, Pierre; and Haicour, Philippe, to Pierrefitte-Auby. Bituminous binder compositions. 3,997,354, Cl. 106-273.00N.

Placek, Ruth M. Instructional birthday cake toy. 3,996,675, Cl. 35-31.00D.

Platts, John Charles; Geisler, Trevor Ross; Harwood, Keith; and Sheahan, Christopher Gerald, to L M Ericsson Pty. Ltd. Time division multiplexed digital switching apparatus. 3,997,727, Cl. 179-15.0AQ.

Playfoot, Kerwin C.; and Todt, William H., to Westinghouse Electric Corporation. Liquid metal level sensor with increased sensitivity. 3,996,801, Cl. 73-304.00R.

Plessey Handel und Investments A.G.: *See—*
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Pletka, Hans-Dieter; and Michel, Rudolf, to Deutsche Gold- und Silber-Scheideanstalt vormals Roessler. Process for the production of sulfur containing organosilicon compounds. 3,997,581, Cl. 260-448.80R.

Plummer, Mark A.; and Roszelle, Wayne O., to Marathon Oil Company. Sulfonate blends useful for improved oil recovery. 3,997,451, Cl. 252-8.55D.

Plymale, Richard W. Composition and method for treating teeth. 3,997,504, Cl. 260-42.270.

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Pohl, Hans-Joachim; Weibrecht, Otto; and Wiesenburg, Ulrich, to Jenoptik Jena G.m.b.H. Arrangement for control of aerial cameras. 3,997,795, Cl. 250-578.000.
Polaroid Corporation: *See—*
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Policansky, Hyman. Fishing reels. 3,997,130, Cl. 242-211.000.
Polymeric Enzymes, Inc.: *See—*
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Pottorff, Marsh. Motorcycle towing devices of fifth wheel type. 3,997,186, Cl. 280-402.000.
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Prince, Jack E.; Terry, Franklin E.; and Mullins, William H. Aerobic type sewage digestion system. 3,997,437, Cl. 210-4.000.
Princell, William E. Disposable end closure. 3,996,966, Cl. 138-89.000.
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Quick, Melvin Randolph. Solar energy collector unit. 3,996,918, Cl. 126-270.000.
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Rilling, Harry Lee, to Midway Fishing Tool Company. Downhole forward and back scuttling tool. 3,997,010, Cl. 175-242.000.
Ring, Peter Norman: *See—*
Bogie, Kenneth David; Pinto, Noel John; and Ring, Peter Norman, 3,997,459.
Ringe, Werner; and Gomann, Jurgen, to Hauni-Werke Korber & Co., KG. Apparatus for forming and transferring thin liquid layers. 3,996,890, Cl. 118-262.000.
Ringsted Jernstoberi & Maskinfabrik A/S: *See—*
Christensen, Kristian Stokbro, 3,997,087.
Rippy, Ronnie R., to United States of America, National Aeronautics and Space Administration. Linear phase demodulator including a phase locked loop with auxiliary feedback loop. 3,997,848, Cl. 329-122.000.
Ritchie, David Scarth; Hamilton, James Gordon; and Martin, Alexander James. Fire control system. 3,997,762, Cl. 235-61.50R.
Riti, Alfred, to Lawrence Peska Associates, Inc., a part interest. Bicycle reflective surface. 3,997,184, Cl. 280-289.00R.
Rittenbach, Otto E., to United States of America, Army. Electronic time compressor/expander utilizing magnetic storage. 3,997,913, Cl. 360-8.000.
Rivas, Amador Royo: *See—*
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Moliner, Jose Gasulla; and Rivas, Amador Royo, 3,997,755.
Rix, Charles E.: *See—*
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Roberts, Donald L.: *See—*
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Scott, Timothy F.; and Brushwyler, Gordon R., 3,997,419.
Rochelle, William R.; Larenzo, Leroy N.; and Ranft, Eberhard V., to Brown & Root, Inc. Method for weight coating pipe segments. 3,997,639, Cl. 264-39.000.
Rochester Silo, Inc.: *See—*
Price, Raymond R., 3,997,025.
Rochling, Hans; Hartel, Kurt; Kirsch, Reinhard; and Duwel, Dieter, to Hoechst Aktiengesellschaft. Substituted triazino-benzimidazoles. 3,997,534, Cl. 260-249.500.
Rockford Manufacturing Company: *See—*
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Rockwell International Corporation: *See—*
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Sutherland, Ray, 3,996,962.
Rodriguez, Edith, to Lawrence Peska Associates, Inc., a part interest. Convertible valence. 3,996,987, Cl. 160-19.000.
Roesch, Egon: *See—*
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Witte, Ernst-Christian; Stach, Kurt; Thiel, Max; Sponer, Gisbert; and Roesch, Egon, 3,997,667.
Rogers, Melvin F., to Zenith Radio Corporation Method of separating a funnel and flangeless faceplate of a color television picture tube bulb. 3,997,311, Cl. 65-23.000.
Rogers, Olbert William. Method of making tooth reconstructions such as inlays and crowns. 3,997,637, Cl. 264-19.000.
Rogers, William Leslie; and Wainstock, Michael A., to University of Michigan. Apparatus and method for locating and quantifying or directing a source of ionizing radiation. 3,997,793, Cl. 250-491.000.
Rohrer, John D.: *See—*
Parker, Shirley L.; and Rohrer, John D., 3,997,215.
Rollei-Werke Franke & Heidecke: *See—*
Decker, Hans-Heino, 3,997,815.
Rolsma, Bernard, to Chrysler Corporation. Low radar cross-section re-entry vehicle. 3,997,899, Cl. 343-18.00A.
Romanzi, Louis, Jr., to Gateway Industries, Inc. Seat belt buckle. 3,996,648, Cl. 24-230.00A.
Romey, Ingo: *See—*
Kolling, Georg; and Romey, Ingo, 3,997,654.
Roos, Paul Francois: *See—*
Sass, Horst Werner; and Roos, Paul Francois, 3,997,152.
Root, James R., to Ruskin Manufacturing Company. Control damper. 3,996,952, Cl. 137-77.000.
Rose, Frank P. Vehicle in-place electric jack. 3,997,143, Cl. 254-86.00R.
Rose, Joseph L.: *See—*
Niklas, Ludwig; Rose, Joseph L.; and Schlengermann, Udo, 3,996,791.
Rosnowski, Wojciech, to RCA Corporation. Diffusion of conductivity modifiers into a semiconductor body. 3,997,379, Cl. 148-189.000.
Ross, Raymond L.: *See—*
Winter, John J.; Breslin, James T.; Ross, Raymond L.; and Rothwarf, Frederick, 3,997,834.
Rosso, John B., to Combustion Engineering, Inc. Turbine meter. 3,996,800, Cl. 73-231.00R.
Rostafinski, Jaroslaw J.: *See—*
Ravani, Chandrakant D.; Schluchter, Ronald G.; Rostafinski, Jaroslaw J.; and Burt, Charles M., 3,996,860.
Roszelle, Wayne O.: *See—*
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Rothwarf, Frederick: *See—*
Winter, John J.; Breslin, James T.; Ross, Raymond L.; and Rothwarf, Frederick, 3,997,834.

Rototron Corporation: *See—*
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Rounds, Hugh G.: *See—*
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Martel, Jacques; Huynh, Chanh; and Buendia, Jean, 3,997,586.
Routh, Herman M.; and Allen, Otis H., Sr. Method for knitting and heat-setting circular knit articles. 3,996,771, Cl. 66-147.000.
Rouzier, Michel M.: *See—*
Duquesne, Jean F.; Rouzier, Michel M.; Revel, Maurice J.; and Louvet, Olivier F., 3,997,728.
Rozgonyi, George Arthur: *See—*
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Ruskin Manufacturing Company: *See—*
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Russell, John D. Apparatus for continuous mining. 3,997,216, Cl. 299-57.000.
Russey, James W., to Caterpillar Tractor Co. Step-grab element system for a vehicle. 3,997,183, Cl. 280-166.000.
Ruti Machinery Works Ltd.: *See—*
Meier, Franz, 3,996,970.
Muller, Walter, 3,996,974.
Strauss, Edgar; and Gsell, Xaver, 3,996,973.
Zollinger, Hans, 3,996,972.
Ruud, Alan J., to Goulet, Donald E., a part interest. Indirect lighting fixture. 3,997,776, Cl. 240-2.0SL.
Ryder, Donald E.: *See—*
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S.E.G. Instrument AB: *See—*
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Safir, Sidney Robert: *See—*
Fanshawe, William Joseph; Crawley, Lantz Stephen; Safir, Sidney Robert; Wiegand, Gretchen Ellen, deceased; and Cooley, Earle Clifford, executor, 3,997,530.
Sagefors, Karl Ivar: *See—*
Hallenius, Tore Jerker; and Sagefors, Karl Ivar, 3,996,751.
Sahara, Hiroshi; Tanaka, Yutaka; and Isobe, Toshinobu, to Sony Corporation. Frequency discriminating circuit. 3,997,797, Cl. 307-233.00R.
St. Clair, John C. Year round cooling water from the cold weather of winter. 3,997,112, Cl. 239-13.000.
Sakai, Hiroshi: *See—*
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Sakamoto, Hideo: *See—*
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Sakurai, Kiyomi; Fukushima, Yutaka; and Yamaguchi, Masami, to Nippon Paint Co., Ltd. Process for preparing image plates with continuous gradation. 3,997,345, Cl. 96-35.100.
Salinger, Fred G., to Electro-Therm, Inc. Electric heating element with bulkhead mounting means. 3,997,760, Cl. 219-336.000.
Salkin, Ralph, to CPC International Inc. Stabilization of xanthophylls. 3,997,679, Cl. 426-250.000.
Sallenave, Guy; Chemereau, Andre; Pomies, Jean-Paul; Thomas, Georges; and Massanes, Andre, to Chantiers de l'Atlantique. Method of building a wall surface linked up with an initial wall and having predetermined relative shape and position. 3,996,717, Cl. 52-744.000.
Salsbury, Phillip J.: *See—*
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San/Bar Corporation: *See—*
Watkins, Arthur Gene, 3,997,737.
Sanders, David Albert, to Browne-Davies Electronic Corporation. Intrinsically safe communication systems. 3,997,733, Cl. 179-81.00R.
Sanders, David E.; Chambers, Ramon P.; and Gordy, Robert S., to NCR Corporation. High speed divide-by-two circuit. 3,997,796, Cl. 307-220.00R.
Sanders, James F., to Minnesota Mining and Manufacturing Company. Light-sensitive development-free driographic printing plate. 3,997,349, Cl. 96-75.000.
Sanders, Robert N.; and Valdo, Alex R., to Ethyl Corporation. Method of preparing an aluminum-silicon composite. 3,997,340, Cl. 75-147.000.
Sandin, Walter T., to Visual Methods, Inc. Compact unit for optical security system. 3,997,723, Cl. 178-7.800.
Sandoz, Inc.: *See—*
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Coombs, Robert V.; and Galantay, Eugene E., 3,997,574.
Eberle, Marcel K., 3,997,670.
Galantay, Eugene E.; and Habeck, Dietmar A., 3,997,664.
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Sangl, Donald W. Linear solenoid motors. 3,996,858, Cl. 104-148.0LM.
Sano, Hideo: *See—*
Takaoka, Michio; Ono, Motoyuki; Oshima, Hiroto; Seki, Masaichiro; and Sano, Hideo, 3,997,288.
Sano, Hiroshi, to Tomy Kogyo Co., Inc. Toy crane. 3,997,061, Cl. 212-63.000.
Sano, Takezo; Kobayashi, Akira; and Murase, Ichiki, to Sumitomo Chemical Company, Limited. Method for manufacturing novel cation exchangers. 3,997,644, Cl. 264-122.000.
Santho, Albert T. Nailable metal post and strap anchor structure. 3,996,861, Cl. 105-480.000.
Santucci, Lawrence E.; Campbell, Robert W.; and Woo, Gar Lok, to Chevron Research Company. Sulfur composition. 3,997,355, Cl. 106-275.000.
Sapkus, Jurgis; and Lewis, J. Stephen, to Mattel, Inc. Sneezing doll. 3,996,695, Cl. 46-118.000.
Sarantakis, Dimitrios, to American Home Products Corporation. Cyclic somatostatin disulfide analogues. 3,997,517, Cl. 260-112.50S.
Sasaki, Nobuhito: *See—*
Aizawa, Masahiro; Bando, Toshiro; Shiina, Toshio; Sasaki, Nobuhito; and Onuma, Terunobu, 3,997,093.
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Tsutsui, Ken; Sasano, Akira; Nakano, Toshio; Matsumaru, Haruo; and Nishimura, Takeo, 3,997,810.
Sass, Horst Werner; and Roos, Paul Francois, to Trident Plastics (Proprietary) Limited. Clamping arrangement. 3,997,152, Cl. 269-249.000.
Sato, Hidenori: *See—*
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Sato, Kouzo: *See—*
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Sato, Takami: *See—*
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Sato, Takefumi; and Yokoyama, Tatuo, to Sharp Kabushiki Kaisha. Alarm system for indicating a fault condition of an anti-skid braking control system. 3,997,889, Cl. 340-256.000.
Sato, Tamio: *See—*
Itoh, Kunio; and Sato, Tamio, 3,997,497.
Sato, Yo, to Kabushiki Kaisha Sato Kenkyusho. Core holding device for label strip. 3,997,124, Cl. 242-68.000.
Sato, Yo, to Kabushiki Kaisha Sato Kenkyusho. Core for label strip. 3,997,125, Cl. 242-68.500.
Sato, Yoshiaki: *See—*
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Satomi, Takeo; Hino, Naganori; Hirano, Masachika; Mukai, Kunio; Sakamoto, Hideo; and Yoshida, Ryo, to Sumitomo Chemical Company, Limited. Amido phosphorothiolate pesticide. 3,997,526, Cl. 260-239.00B.
Saunders, Richard C., to Electric Power Research Institute. Modular electrical energy storage device. 3,997,363, Cl. 429-66.000.
Sawa, Yuji: *See—*
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Sawada, Takao: *See—*
Ikeo, Hirofumi; Noda, Shoichi; Sawada, Takao; Okamoto, Eichi; and Muto, Katsutoshi, 3,997,350.
Sayles, Francis S., to Mobil Oil Corporation. Paraffinic base greases. 3,997,455, Cl. 252-36.000.
Scaletta, Joseph L.: *See—*
Parker, Delmer G.; and Scaletta, Joseph L., 3,996,892.
Scarola, Leonard J. Mop holder having slideable jaw. 3,996,638, Cl. 15-151.000.
Schagen, Fritz, to Fa. Immobilien Commerce Estbl. Dr. Ivo Beck. Windsurfer. 3,996,868, Cl. 114-39.000.
Schasser, Donald S., to Automatic Parking Devices, Inc. Automatic ticket chute. 3,997,044, Cl. 194-4.00C.
Schasser, Donald S., to Automatic Parking Devices, Inc. Ticket reader and imprinter with bypass switch. 3,997,763, Cl. 235-61.90R.
Schaupp, Kurt, to Bayer Aktiengesellschaft. Mortar of inorganic binder and formaldehyde condensation product of sulfonated aromatic ether, imine or sulfone. 3,997,502, Cl. 260-37.00R.
Schefczik, Ernst; and Kast, Hellmut, to BASF Aktiengesellschaft. Lactones of the benzazaxanthene series and dye-forming components for duplication processes. 3,997,541, Cl. 260-287.00C.
Scherbatskoy, Serge A.: *See—*
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Scherpenisse, Pieter: *See—*
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Scherping, Clarence K., to Baker Perkins. Continuous mixer. 3,997,147, Cl. 259-191.000.

Scherrer, Hanspeter: *See—*
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Boller, Arthur; Cereghetti, Marco; and Scherrer, Hanspeter, 3,997,536.

Scherzer, Erwin, to C. Proebster jr. Nachfolger. Microscope with body tube formed of complemental shell halves. 3,997,239, Cl. 350-84.000.

Schilke, Neil A.: *See—*
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Schindele, Alfred; and Mueller, Gerhard, to C. Terrot Soehne. Needle controlling mechanism for circular knitting machines. 3,996,769, Cl. 66-50.00R.

Schirmer, Henry G.: *See—*
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Schirtzinger, Joseph F., to Sea-Log Corporation. Method and apparatus for supporting a drilling platform on the ocean floor. 3,996,756, Cl. 61-88.000.

Schlachter, Kurt, to Kramer & Grebe GmbH & Co. KG Maschinen- und Modellfabrik. Packaging machine. 3,996,726, Cl. 53-112.00A.

Schlaepfer, Hansjorg, to Contraves AG. Method of increasing the signal-to-noise ratio of a time-dependent scanning signal during performance of a periodic scanning method. 3,997,774, Cl. 235-193.000.

Schlatter, Rudolph; and Adams, Charles DeWitt, to Du Pont de Nemours, E. I., and Company. 2-Benzimidazolecarbamic acid esters by the cyanamide process. 3,997,553, Cl. 260-309.200.

Schlengermann, Udo: *See—*
Niklas, Ludwig; Rose, Joseph L.; and Schlengermann, Udo, 3,996,791.

Schlesinger, Sheldon Irwin; and Boszak, Ronald J., to American Can Company. Dry positive photopolymer imaging process involving heating and application of toner. 3,997,344, Cl. 96-33.000.

Schloetterer, Heinrich; and Tihanyi, Jenoe, to Siemens Aktiengesellschaft. Schottky gate field effect transistor. 3,997,908, Cl. 357-22.000.

Schluchter, Ronald G.: *See—*
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Schlundt, Dieter: *See—*
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Schmidt, Hans-Joachim: *See—*
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Schmitt, Joseph Lawrence, Jr.; and Castellion, George Augustus, to American Cyanamid Company. Hydrodesulfurization catalysts supported on carbon. 3,997,473, Cl. 252-439.000.

Schneekluth, Herbert, to Schottel-Werft Josef Becker KG. Ship propeller arrangement. 3,996,877, Cl. 115-37.000.

Schneider, Kurt; Vogel, Helmut; Meyer, Wolfgang; and Brassat, Bert, to Bayer Aktiengesellschaft. Process for the production of polyamide mouldings. 3,997,646, Cl. 264-176.00R.

Schneider, William H., to Qualitrol Corporation. Rotary indicating instrument with magnetic reset. 3,996,881, Cl. 116-129.00B.

Schnell, Philip George, to Standard Oil Company (Indiana). Method to improve the physical organoleptical and functional properties of flour-based products through the use of yeast and product of said method. 3,997,683, Cl. 426-552.000.

Schoenrock, Karlheinz W. R.; Hsieh, Chia-Lung; and Rounds, Hugh G., to Amalgamated Sugar Company, The. Continuous process for the recovery of sugar from molasses. 3,997,357, Cl. 127-47.000.

Scholz, Hugo-Peter: *See—*
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Schornack, Louis Wilfred; and Graf, William Frank, Jr., to Motorola, Inc. RF amplifier. 3,997,852, Cl. 330-35.000.

Schottel-Werft Josef Becker KG: *See—*
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Schrewe, Hans; and Frenken, Klaus, to Mannesmann Aktiengesellschaft. Supplying molten metal to a mold for continuous casting. 3,996,994, Cl. 164-281.00R.

Schroeder, James E.: *See—*
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Schubert, John C.; and Case, Charles B., to Standard Oil Company (Indiana). Punch for producing holes in foamed thermoplastic containers. 3,996,832, Cl. 83-686.000.

Schuh, Eduard: *See—*
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Schupner, Willard J., to Efdyn Corporation. Adjustable shock absorber. 3,997,037, Cl. 188-315.000.

Schurb, Frank A.; and Evans, Jack L., to Minnesota Mining and Manufacturing Company. Stratum having release properties and method of making. 3,997,702, Cl. 428-352.000.

Schutte, Hendrik, to Air-O-Burner BV. Gas burner. 3,997,287, Cl. 431-355.000.

Schutze, Siegfried; and Locke, Werner, to VEB Pentacon Dresden. Camera circuit arrangement for the pre-indication of exposure time. 3,997,904, Cl. 354-23.00R.

Schwartz, Joseph R.: *See—*
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Schwartz, Leonard: *See—*
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Schwartz, Richard, to North American Enclosures, Inc. Self contained frame. 3,996,682, Cl. 40-156.000.

Sciulli, Joseph Albert: *See—*
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Scorpion, Inc.: *See—*
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Scott, Timothy F.; and Brushwyler, Gordon R., to Robertshaw Controls Company. Dissolved oxygen cell. 3,997,419, Cl. 204-195.00P.

Scragg, Edgar Peter. Apparatus for dosing a flowing fluid. 3,996,953, Cl. 137-101.110.

Scullin, Francis E., to Crown Recreation, Inc. Dart board game. 3,997,162, Cl. 273-95.00R.

Sea-Log Corporation: *See—*
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Searcy, William W.: *See—*
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Sechi, Franco Nicola, to United States of America, Army. RF-drive equalizer for multicell microwave transistor. 3,997,851, Cl. 330-31.000.

Secker, Philip Edward. Device for neutralizing the charge on statically-charged surfaces. 3,997,817, Cl. 317-2.00F.

Secretan, Stanley, to Bendix Corporation, The. Connector for small diameter towed sonar array. 3,997,230, Cl. 339-49.00R.

Seebinger, Frederick L., to American Trading and Production Corporation. Loudspeaker drive mechanism monitoring assembly. 3,997,724, Cl. 179-1.0MN.

Seeger, Ernst; Engel, Wolfhard; Nickl, Josef; and Teufel, Helmut, to Boehringer Ingelheim GmbH. 4-(2'-Fluoro-4-biphenylylr-4-oxo-butyric acid and esters and salts thereof. 3,997,589, Cl. 260-469.000.

Seiffert, Ulrich; Struwe, Burckhard; Paitula, Hannu; and Borenius, Gunnar, to Volkswagenwerk Aktiengesellschaft. Safety arrangement. 3,997,190, Cl. 280-747.000.

Seiko Koki Kabushiki Kaisha: *See—*
Kitai, Kiyoshi; Ogihara, Masuo; Sato, Kouzo; and Shinozaki, Nobuo, 3,996,754.

Seki, Hiromitsu; and Yamamoto, Kenji, to Yamamoto Kagaku Gosei Kabushiki Kaisha. Pressure sensitive copying paper. 3,997,561, Cl. 260-335.000.

Seki, Masaichiro: *See—*
Takaoka, Michio; Ono, Motoyuki; Oshima, Hiroto; Seki, Masaichiro; and Sano, Hideo, 3,997,288.

Sekulich, Mark W. Self-contained gynecologic stimulator. 3,996,930, Cl. 128-67.000.

Seldin, Ira L.: *See—*
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Sellstedt, John H., to American Home Products Corporation. Intermediates for producing semi-synthetic cephalosporins. 3,997,532, Cl. 260-243.00C.

Selmer, Uwe: *See—*
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Sendo, Yuji: *See—*
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Seng, Florin; Ley, Kurt; and Metzger, Karl Georg, to Bayer Aktiengesellschaft. Veterinary feedstuffs. 3,997,665, Cl. 424-246.000.

Serensen, William, Jr.: *See—*
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Servassier, Alfred, to Institut Francaise du Petrole, des Carburants et Lubrifiants et Entreprise de Recherches et d'Activities Petrolieres Elf. Ionization flow detector. 3,996,795, Cl. 73-194.00F.

Servo Chem AB: *See—*
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Sevick, Timothy A.: *See—*
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Sexton, Sanford R.: *See—*
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Sgariglia, Vincent F. Chain cutting apparatus. 3,996,782, Cl. 72-332.000.

Shakun, Wallace: *See—*
Calme, Edward E.; and Shakun, Wallace, 3,996,762.

Shamos, Morris H.; Brand, Michael J.; and Calogero, William J., to Technicon Instruments Corporation. Apparatus and method for measurement of total volume of particles in a liquid sample. 3,997,838, Cl. 324-71.00R.

Sharon, Harold Maynard, to United Technologies Corporation. Shroud wear measurement. 3,996,668, Cl. 33-170.000.

Sharp Kabushiki Kaisha: *See—*
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Shepherd, George E., to Procedures, Systemes et Methodes P.S.M. (1972) Inc. Duplicating apparatus. 3,996,854, Cl. 101-132.500.

Sheridan, David S.; and Jackson, Isaac S., to National Catheter Corporation. Intubation stylets. 3,996,939, Cl. 128-351.000.

Sherman, Guy J., to Milton Roy Company. Enclosure for hard and soft contact lenses. 3,997,049, Cl. 206-5.100.

Sherwood, Theodore R., to United States of America, Navy. Test connector. 3,997,231, Cl. 339-75.00M.

Shibata, Tatsuo; and Tanaka, Yoshio, to Iri-E Kosan Corporation. Apparatus for cleaning the inside of ingot molds or other hollow bodies having interiors of varying shapes and sizes. 3,996,637, Cl. 15-56.000.

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Shimojo, Nobuei; and Minesaki, Ichihito, to TDK Electronics Company, Limited. Method of reducing the evaporation of Pb during the manufacture of barium titanate (Pb substituted) semiconducting ceramics. 3,997,479, Cl. 252-520.000.

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Sokolovsky, Mordechai; Rehavi, Moshe; and Maayani, Saul. Process for preparing quinuclidine enantiomers. 3,997,543, Cl. 260-293.530.

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Suzuki, Toshio, to Shinri Kogyo Company Limited. Apparatus for measuring dimensions of travelling objects. 3,997,270, Cl. 356-167.000.

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Takahashi, Koji; Yamaguchi, Norishige; Hori, Makoto; and Sugimura, Yoshiaki, to TDK Electronics Company, Limited. Ceramic dielectric composition. 3,997,457, Cl. 252-63.500.

Takano, Eiichi, to Canon Kabushiki Kaisha. Zoom lens having well-compensated distortion. 3,997,244, Cl. 350-184.000.

Takaoka, Michio; Ono, Motoyuki; Oshima, Hiroto; Seki, Masaichiro; and Sano, Hideo, to Fujikura Cable Works, Ltd., The. Horizontal-type apparatus for curing insulating material. 3,997,288, Cl. 432-197.000.

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Zenkert, Heinrich: *See*—
Eggert, Hans-Joachim; Oberberger, Otto; and Zenkert, Heinrich, 3,997,819.
Zeuthen & Aagaard A/S: *See*—
Zeuthen, Karl Gustav, 3,997,261.
Zeuthen, Karl Gustav, to Zeuthen & Aagaard A/S. Electrophotographic copying apparatus. 3,997,261, Cl. 355-8.000.
Ziche, Horst, to Henkel & Cie G.m.b.H. Improvements in treatment of high-molecular-weight water-soluble compounds with glyoxal. 3,997,508, Cl. 260-72.00R.
Ziegler, Gunther; and Lanig, Peter, to Siemens Aktiengesellschaft. Method for the manufacture of a superconductor having an intermetallic two element compound. 3,996,661, Cl. 29-599.000.
Zimmer, Raymond. Mill for grinding vegetable products. 3,997,120, Cl. 241-56.000.
Zimmermann, Fritz: *See*—
Feierabend, Karl; Bauder, Armin; and Zimmermann, Fritz, 3,996,900.
Zink, Philip L.: *See*—
Garst, Michael G.; Towe, Donald D.; Zink, Philip L.; and Gilles, Theodore P., 3,996,998.
Zinser, Edward, to Lawrence Peska Associates, Inc., a part interest. Parachute toy. 3,996,694, Cl. 46-86.00R.
Zollinger, Hans, to Ruti Machinery Works Ltd. Arrangement for actuating laminas on a wave-type loom. 3,996,972, Cl. 139-436.000.
Zollman, Orville D. Safety lock for power driven machines. 3,996,808, Cl. 74-217.00C.
Zsagar, Hans-Joachim, to Sulzer Morat GmbH, Firma. Method and apparatus for automatic patterning correction. 3,997,912, Cl. 358-78.000.
Zurcher, Rudolf F., to Hughes Aircraft Company. Electronic watch construction. 3,996,735, Cl. 58-50.00R.
1st National Bank of Libertyville: *See*—
Cauley, Ronald R.; and Hoskins, William G., 3,997,871.

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 78,315	3,982,192	Feb. 10, 1976	Sep. 21, 1976
B 79,099	3,982,177	Jan. 13, 1976	Sep. 21, 1976
B 150,142	3,981,767	Jan. 27, 1976	Sep. 21, 1976
B 160,045	3,983,446	Jan. 13, 1976	Sep. 28, 1976
B 160,099	3,987,221	Jan. 13, 1976	Oct. 19, 1976
B 163,463	3,981,659	Jan. 27, 1976	Sep. 21, 1976
B 200,759	3,986,872	Feb. 3, 1976	Oct. 19, 1976
B 208,916	3,987,106	Jan. 13, 1976	Oct. 19, 1976
B 214,925	3,997,648	Mar. 9, 1976	Dec. 14, 1976
B 223,678	3,989,159	Mar. 9, 1976	Nov. 2, 1976
B 248,240	3,983,556	Jan. 13, 1976	Sep. 28, 1976
B 270,274	3,982,223	Feb. 17, 1976	Sep. 21, 1976
B 270,351	3,997,893	Mar. 30, 1976	Dec. 14, 1976
B 276,026	3,992,405	Feb. 3, 1976	Nov. 16, 1976
B 279,969	3,986,073	Jan. 13, 1976	Oct. 12, 1976
B 283,941	3,995,313	Feb. 3, 1976	Nov. 30, 1976
B 301,143	3,991,107	Jan. 27, 1976	Nov. 9, 1976
B 302,160	3,985,774	Feb. 3, 1976	Oct. 12, 1976
B 306,668	3,985,713	Feb. 3, 1976	Oct. 12, 1976
B 307,698	3,993,763	Feb. 3, 1976	Nov. 23, 1976
B 308,659	3,981,947	Jan. 27, 1976	Sep. 21, 1976
B 311,450	3,988,976	Mar. 9, 1976	Nov. 2, 1976
B 326,211	3,988,272	Mar. 23, 1976	Oct. 26, 1976
B 330,736	3,996,299	Feb. 3, 1976	Dec. 7, 1976
B 333,110	3,989,867	Mar. 16, 1976	Nov. 2, 1976
B 336,754	3,989,805	Mar. 16, 1976	Nov. 2, 1976
B 339,194	3,982,215	Feb. 3, 1976	Sep. 21, 1976
B 348,433	3,984,405	Feb. 3, 1976	Oct. 5, 1976
B 349,370	3,989,684	Jan. 27, 1976	Nov. 2, 1976
B 354,959	3,995,996	Feb. 17, 1976	Dec. 7, 1976
B 356,187	3,981,222	Jan. 20, 1976	Sep. 21, 1976
B 358,260	3,989,661	Mar. 30, 1976	Nov. 2, 1976
B 358,427	3,989,896	Feb. 3, 1976	Nov. 2, 1976
B 359,901	3,981,729	Jan. 13, 1976	Sep. 21, 1976
B 364,797	3,996,131	Feb. 17, 1976	Dec. 7, 1976
B 367,621	3,989,589	Feb. 3, 1976	Nov. 2, 1976
B 369,221	3,985,834	Feb. 24, 1976	Oct. 12, 1976
B 370,309	3,989,640	Jan. 20, 1976	Nov. 2, 1976
B 371,912	3,995,738	Mar. 2, 1976	Dec. 7, 1976
B 372,016	3,989,685	Mar. 9, 1976	Nov. 2, 1976
B 373,354	3,989,870	Jan. 27, 1976	Nov. 2, 1976
B 374,588	3,985,899	Jan. 27, 1976	Oct. 12, 1976
B 378,513	3,981,750	Jan. 27, 1976	Sep. 21, 1976
B 379,177	3,981,976	Jan. 27, 1976	Sep. 21, 1976
B 381,709	3,984,587	Jan. 13, 1976	Oct. 5, 1976
B 381,985	3,990,775	Feb. 3, 1976	Nov. 9, 1976
B 384,330	3,985,613	Jan. 27, 1976	Oct. 12, 1976
B 384,654	3,992,681	Feb. 24, 1976	Nov. 16, 1976
B 385,024	3,994,911	Feb. 10, 1976	Nov. 30, 1976
B 385,483	3,993,684	Feb. 17, 1976	Nov. 23, 1976
B 385,631	3,982,924	Jan. 27, 1976	Sep. 28, 1976
B 386,257	3,981,915	Feb. 3, 1976	Sep. 21, 1976
B 386,673	3,993,717	Feb. 3, 1976	Nov. 23, 1976
B 386,828	3,992,440	Feb. 3, 1976	Nov. 16, 1976
B 389,304	3,986,829	Jan. 27, 1976	Oct. 19, 1976
B 390,031	3,985,799	Jan. 13, 1976	Oct. 12, 1976
B 390,408	3,992,426	Feb. 3, 1976	Nov. 16, 1976
B 391,473	3,988,370	Mar. 2, 1976	Oct. 26, 1976
B 391,797	3,988,046	Mar. 9, 1976	Oct. 26, 1976
B 392,798	3,996,249	Mar. 30, 1976	Dec. 7, 1976
B 394,248	3,989,764	Jan. 27, 1976	Nov. 2, 1976
B 394,350	3,982,200	Jan. 13, 1976	Sep. 21, 1976
B 396,164	3,989,590	Feb. 3, 1976	Nov. 2, 1976
B 398,084	3,996,239	Feb. 3, 1976	Dec. 7, 1976
B 398,220	3,990,834	Feb. 3, 1976	Nov. 9, 1976
B 398,488	3,987,991	Feb. 24, 1976	Oct. 26, 1976
B 399,098	3,997,665	Feb. 24, 1976	Dec. 14, 1976
B 399,908	3,983,323	Jan. 13, 1976	Sep. 28, 1976
B 400,871	3,988,893	Feb. 17, 1976	Nov. 2, 1976
B 401,042	D 242,197	Mar. 16, 1976	Nov. 9, 1976
B 402,162	3,994,902	Mar. 2, 1976	Nov. 30, 1976
B 402,328	3,995,545	Apr. 6, 1976	Dec. 7, 1976
B 402,553	3,983,219	Feb. 17, 1976	Sep. 28, 1976
B 402,929	3,991,251	Feb. 3, 1976	Nov. 9, 1976
B 403,243	3,996,232	Mar. 30, 1976	Dec. 7, 1976
B 403,477	3,995,315	Feb. 3, 1976	Nov. 30, 1976
B 403,507	3,982,095	Feb. 10, 1976	Sep. 21, 1976
B 403,766	3,994,834	Feb. 10, 1976	Nov. 30, 1976
B 405,726	3,981,241	Jan. 13, 1976	Sep. 21, 1976
B 407,737	3,992,546	Feb. 3, 1976	Nov. 16, 1976
B 409,848	3,983,270	Jan. 27, 1976	Sep. 28, 1976
B 410,694	3,995,530	Mar. 23, 1976	Dec. 7, 1976
B 411,471	3,982,933	Feb. 17, 1976	Sep. 28, 1976
B 411,765	3,993,428	Feb. 24, 1976	Nov. 23, 1976
B 412,068	3,981,244	Jan. 13, 1976	Sep. 21, 1976
B 414,028	3,993,738	Feb. 17, 1976	Nov. 23, 1976
B 414,266	3,993,614	Feb. 10, 1976	Nov. 23, 1976
B 414,481	3,982,979	Jan. 20, 1976	Sep. 28, 1976
B 414,971	D 242,208	Feb. 10, 1976	Nov. 9, 1976
B 415,021	3,994,173	Mar. 2, 1976	Nov. 30, 1976
B 415,122	3,997,503	Feb. 10, 1976	Dec. 14, 1976
B 416,589	3,990,363	Jan. 27, 1976	Nov. 9, 1976
B 417,014	3,981,851	Jan. 13, 1976	Sep. 21, 1976
B 417,349	3,985,076	Mar. 9, 1976	Oct. 12, 1976
B 418,489	3,989,592	Jan. 13, 1976	Nov. 2, 1976
B 419,582	3,989,681	Mar. 2, 1976	Nov. 2, 1976
B 420,321	3,990,645	Mar. 30, 1976	Nov. 9, 1976
B 420,472	3,993,934	Feb. 24, 1976	Nov. 23, 1976
B 421,975	3,994,693	Mar. 2, 1976	Nov. 30, 1976
B 422,063	3,994,835	Feb. 3, 1976	Nov. 30, 1976
B 423,365	3,996,186	Feb. 17, 1976	Dec. 7, 1976
B 423,404	3,990,958	Mar. 2, 1976	Nov. 9, 1976
B 423,441	3,997,137	Feb. 17, 1976	Dec. 14, 1976
B 423,867	3,990,844	Feb. 3, 1976	Nov. 9, 1976
B 423,883	3,986,871	Jan. 27, 1976	Oct. 19, 1976
B 424,354	D 242,416	Feb. 10, 1976	Nov. 23, 1976
B 424,989	3,990,569	Feb. 3, 1976	Nov. 9, 1976
B 425,588	3,985,111	Jan. 13, 1976	Oct. 12, 1976
B 426,424	3,993,742	Feb. 3, 1976	Nov. 23, 1976
B 426,639	3,992,539	Feb. 3, 1976	Nov. 16, 1976
B 426,819	3,995,868	Feb. 17, 1976	Dec. 7, 1976
B 427,883	3,982,277	Jan. 20, 1976	Sep. 21, 1976
B 428,271	3,987,415	Mar. 23, 1976	Oct. 19, 1976
B 428,408	3,995,252	Mar. 2, 1976	Nov. 30, 1976
B 428,877	3,984,649	Jan. 27, 1976	Oct. 5, 1976
B 429,018	3,990,061	Feb. 10, 1976	Nov. 2, 1976
B 429,157	3,990,628	Jan. 27, 1976	Nov. 9, 1976
B 429,434	3,989,223	Feb. 17, 1976	Nov. 2, 1976
B 430,157	3,992,465	Feb. 17, 1976	Nov. 16, 1976
B 430,172	3,982,563	Jan. 13, 1976	Sep. 28, 1976
B 430,276	3,982,171	Jan. 20, 1976	Sep. 21, 1976
B 430,287	D 242,489	Feb. 10, 1976	Nov. 23, 1976
B 430,334	3,981,677	Jan. 27, 1976	Sep. 21, 1976
B 431,072	3,985,610	Jan. 20, 1976	Oct. 12, 1976
B 431,334	3,988,095	Mar. 16, 1976	Oct. 26, 1976
B 432,049	3,995,123	Mar. 23, 1976	Nov. 30, 1976
B 432,969	3,997,017	Mar. 2, 1976	Dec. 14, 1976
B 432,991	3,991,669	Mar. 2, 1976	Nov. 16, 1976
B 433,094	3,987,768	Jan. 27, 1976	Oct. 26, 1976
B 434,206	3,994,610	Feb. 3, 1976	Nov. 30, 1976
B 436,724	3,991,856	Feb. 24, 1976	Nov. 16, 1976
B 437,559	3,993,287	Feb. 3, 1976	Nov. 23, 1976
B 437,596	3,985,638	Jan. 27, 1976	Oct. 12, 1976
B 438,484	3,992,451	Feb. 17, 1976	Nov. 16, 1976
B 438,882	3,983,719	Feb. 24, 1976	Oct. 5, 1976
B 438,916	3,983,050	Jan. 13, 1976	Sep. 28, 1976
B 439,542	3,982,199	Jan. 27, 1976	Sep. 21, 1976
B 440,858	3,993,670	Feb. 3, 1976	Nov. 23, 1976
B 441,723	3,988,249	Mar. 16, 1976	Oct. 26, 1976
B 442,163	D 242,192	Mar. 16, 1976	Nov. 9, 1976
B 442,810	3,997,533	Feb. 24, 1976	Dec. 14, 1976
B 442,866	3,982,351	Feb. 24, 1976	Sep. 28, 1976
B 442,970	3,989,890	Feb. 3, 1976	Nov. 2, 1976
B 443,163	3,981,242	Feb. 3, 1976	Sep. 21, 1976
B 443,446	D 242,494	Apr. 6, 1976	Nov. 23, 1976
B 443,563	3,996,204	Feb. 24, 1976	Dec. 7, 1976
B 443,647	3,990,737	Feb. 17, 1976	Nov. 9, 1976
B 443,712	3,982,233	Jan. 27, 1976	Sep. 21, 1976
B 444,437	3,995,171	Mar. 9, 1976	Nov. 30, 1976
B 445,459	3,988,889	Feb. 3, 1976	Nov. 2, 1976
B 445,493	3,994,903	Mar. 2, 1976	Nov. 30, 1976
B 447,000	3,984,419	Feb. 3, 1976	Oct. 5, 1976
B 447,440	3,991,724	Feb. 17, 1976	Nov. 16, 1976
B 449,892	3,997,919	Mar. 23, 1976	Dec. 14, 1976
B 450,196	3,997,701	Feb. 10, 1976	Dec. 14, 1976
B 450,521	3,982,838	Feb. 17, 1976	Sep. 28, 1976
B 450,701	3,991,084	Mar. 16, 1976	Nov. 9, 1976
B 450,708	3,989,724	Mar. 9, 1976	Nov. 2, 1976
B 450,967	3,983,055	Jan. 13, 1976	Sep. 28, 1976
B 451,248	3,997,758	Mar. 2, 1976	Dec. 14, 1976
B 451,308	3,991,037	Feb. 17, 1976	Nov. 9, 1976
B 451,438	Re. 29,066	Mar. 2, 1976	Dec. 7, 1976
B 451,534	3,986,033	Jan. 13, 1976	Oct. 12, 1976
B 452,672	3,981,602	Jan. 13, 1976	Sep. 21, 1976
B 452,883	3,981,735	Jan. 27, 1976	Sep. 21, 1976
B 452,938	3,994,719	Feb. 17, 1976	Nov. 30, 1976
B 453,238	3,997,063	Mar. 2, 1976	Dec. 14, 1976
B 453,533	3,997,744	Feb. 17, 1976	Dec. 14, 1976
B 453,616	3,987,376	Jan. 27, 1976	Oct. 19, 1976
B 453,759	3,989,790	Jan. 27, 1976	Nov. 2, 1976
B 454,283	3,995,153	Feb. 3, 1976	Nov. 30, 1976
B 455,425	3,990,060	Feb. 3, 1976	Nov. 2, 1976
B 455,481	3,991,092	Feb. 24, 1976	Nov. 9, 1976
B 455,759	3,984,242	Feb. 24, 1976	Oct. 5, 1976

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DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 456,148	3,984,269	Jan. 13, 1976	Oct. 5, 1976
B 456,579	3,993,715	Feb. 10, 1976	Nov. 23, 1976
B 456,900	3,996,262	Feb. 3, 1976	Dec. 7, 1976
B 457,547	3,996,397	Feb. 17, 1976	Dec. 7, 1976
B 457,850	3,993,586	Feb. 10, 1976	Nov. 23, 1976
B 457,862	3,987,195	Jan. 27, 1976	Oct. 19, 1976
B 457,886	3,988,498	Jan. 13, 1976	Oct. 26, 1976
B 458,500	3,997,805	Feb. 24, 1976	Dec. 14, 1976
B 458,617	3,984,422	Feb. 3, 1976	Oct. 5, 1976
B 458,964	3,996,615	Mar. 2, 1976	Dec. 7, 1976
B 459,597	3,996,711	Feb. 17, 1976	Dec. 14, 1976
B 459,811	3,982,173	Jan. 20, 1976	Sep. 21, 1976
B 460,388	3,989,448	Jan. 27, 1976	Nov. 2, 1976
B 460,441	3,981,828	Jan. 13, 1976	Sep. 21, 1976
B 460,846	3,985,817	Feb. 24, 1976	Oct. 12, 1976
B 461,184	3,992,482	Feb. 17, 1976	Nov. 16, 1976
B 461,336	3,982,231	Feb. 3, 1976	Sep. 21, 1976
B 461,352	3,981,681	Jan. 13, 1976	Sep. 21, 1976
B 461,874	3,982,276	Jan. 27, 1976	Sep. 21, 1976
B 462,386	3,988,188	Jan. 13, 1976	Oct. 26, 1976
B 462,424	3,989,602	Feb. 24, 1976	Nov. 2, 1976
B 462,893	3,984,253	Feb. 24, 1976	Oct. 5, 1976
B 463,322	3,989,982	Jan. 20, 1976	Nov. 2, 1976
B 463,388	3,992,605	Feb. 10, 1976	Nov. 16, 1976
B 463,671	3,985,385	Jan. 13, 1976	Oct. 12, 1976
B 464,290	3,990,307	Feb. 3, 1976	Nov. 9, 1976
B 464,587	3,991,091	Feb. 3, 1976	Nov. 9, 1976
B 464,593	3,997,659	Mar. 9, 1976	Dec. 14, 1976
B 465,145	3,981,148	Jan. 27, 1976	Sep. 21, 1976
B 465,202	3,989,757	Feb. 24, 1976	Nov. 2, 1976
B 465,393	3,987,390	Jan. 27, 1976	Oct. 19, 1976
B 465,688	3,989,770	Jan. 27, 1976	Nov. 2, 1976
B 465,955	3,997,502	Feb. 3, 1976	Dec. 14, 1976
B 466,390	3,983,349	Feb. 24, 1976	Sep. 28, 1976
B 466,444	3,986,039	Jan. 20, 1976	Oct. 12, 1976
B 466,906	3,993,037	Mar. 16, 1976	Nov. 23, 1976
B 466,929	3,991,195	Jan. 27, 1976	Nov. 9, 1976
B 467,250	3,997,428	Feb. 3, 1976	Dec. 14, 1976
B 467,328	3,997,599	Mar. 9, 1976	Dec. 14, 1976
B 467,412	3,981,265	Jan. 13, 1976	Sep. 21, 1976
B 467,486	3,991,725	Mar. 16, 1976	Nov. 16, 1976
B 467,971	3,983,453	Jan. 13, 1976	Sep. 28, 1976
B 468,052	3,988,335	Feb. 10, 1976	Oct. 26, 1976
B 468,100	3,995,107	Mar. 9, 1976	Nov. 30, 1976
B 468,350	3,981,922	Jan. 13, 1976	Sep. 21, 1976
B 469,947	3,984,153	Jan. 20, 1976	Oct. 5, 1976
B 470,170	3,986,410	Jan. 13, 1976	Oct. 19, 1976
B 470,348	3,981,929	Jan. 13, 1976	Sep. 21, 1976
B 470,576	3,997,507	Feb. 24, 1976	Dec. 14, 1976
B 470,601	3,985,655	Mar. 9, 1976	Oct. 12, 1976
B 470,798	3,987,480	Jan. 20, 1976	Oct. 19, 1976
B 470,899	3,996,441	Mar. 2, 1976	Dec. 7, 1976
B 471,221	3,981,974	Jan. 13, 1976	Sep. 21, 1976
B 471,405	3,993,576	Feb. 10, 1976	Nov. 23, 1976
B 471,494	3,993,660	Mar. 16, 1976	Nov. 23, 1976
B 471,579	3,985,689	Jan. 13, 1976	Oct. 12, 1976
B 471,617	3,994,871	Feb. 10, 1976	Nov. 30, 1976
B 471,735	3,989,408	Feb. 3, 1976	Nov. 2, 1976
B 472,241	3,992,453	Feb. 17, 1976	Nov. 16, 1976
B 472,256	3,985,789	Jan. 13, 1976	Oct. 12, 1976
B 472,284	3,982,078	Jan. 13, 1976	Sep. 21, 1976
B 473,039	3,985,747	Feb. 10, 1976	Oct. 12, 1976
B 473,040	3,985,738	Feb. 10, 1976	Oct. 12, 1976
B 473,813	3,989,071	Mar. 9, 1976	Nov. 2, 1976
B 473,972	3,984,043	Jan. 13, 1976	Oct. 5, 1976
B 474,573	3,988,375	Jan. 20, 1976	Oct. 26, 1976
B 474,747	3,997,704	Feb. 24, 1976	Dec. 14, 1976
B 475,236	3,989,990	Feb. 3, 1976	Nov. 2, 1976
B 475,681	3,983,332	Jan. 20, 1976	Sep. 28, 1976
B 476,372	3,985,771	Feb. 24, 1976	Oct. 12, 1976
B 476,577	3,982,070	Jan. 20, 1976	Sep. 21, 1976
B 476,681	3,986,181	Jan. 13, 1976	Oct. 12, 1976
B 476,967	3,995,206	Mar. 9, 1976	Nov. 30, 1976
B 477,252	3,985,759	Jan. 13, 1976	Oct. 12, 1976
B 477,481	3,991,076	Feb. 3, 1976	Nov. 9, 1976
B 477,597	3,993,912	Feb. 17, 1976	Nov. 23, 1976
B 478,739	3,992,253	Feb. 17, 1976	Nov. 16, 1976
B 479,175	3,985,700	Feb. 17, 1976	Oct. 12, 1976
B 479,242	3,983,074	Feb. 17, 1976	Sep. 28, 1976
B 479,681	D 242,672	Mar. 16, 1976	Dec. 14, 1976
B 480,292	3,994,011	Mar. 16, 1976	Nov. 23, 1976
B 480,350	3,994,164	Feb. 10, 1976	Nov. 30, 1976
B 480,452	3,994,923	Feb. 10, 1976	Nov. 30, 1976
B 480,473	3,995,608	Mar. 2, 1976	Dec. 7, 1976
B 480,604	3,985,251	Jan. 13, 1976	Oct. 12, 1976
B 480,625	3,996,227	Feb. 24, 1976	Dec. 7, 1976
B 480,662	3,988,382	Mar. 2, 1976	Oct. 26, 1976
B 480,740	3,996,431	Mar. 2, 1976	Dec. 7, 1976
B 481,600	3,981,235	Jan. 27, 1976	Sep. 21, 1976
B 481,737	3,982,057	Jan. 13, 1976	Sep. 21, 1976
B 481,930	3,992,717	Feb. 24, 1976	Nov. 16, 1976
B 482,660	3,995,026	Feb. 10, 1976	Nov. 30, 1976
B 482,709	3,985,733	Feb. 24, 1976	Oct. 12, 1976
B 482,907	3,984,811	Jan. 20, 1976	Oct. 5, 1976
B 483,256	3,981,723	Feb. 10, 1976	Sep. 21, 1976
B 483,268	3,995,215	Mar. 9, 1976	Nov. 30, 1976
B 483,606	3,986,990	Jan. 27, 1976	Oct. 19, 1976
B 483,615	3,988,637	Jan. 27, 1976	Oct. 26, 1976
B 483,762	3,993,608	Feb. 10, 1976	Nov. 23, 1976
B 483,865	3,985,693	Jan. 13, 1976	Oct. 12, 1976
B 484,029	3,983,558	Feb. 10, 1976	Sep. 28, 1976
B 484,067	3,992,374	Feb. 17, 1976	Nov. 16, 1976
B 484,068	3,994,937	Mar. 2, 1976	Nov. 30, 1976
B 484,121	3,997,770	Mar. 16, 1976	Dec. 14, 1976
B 484,332	3,986,540	Mar. 2, 1976	Oct. 19, 1976
B 484,365	3,983,578	Jan. 27, 1976	Sep. 28, 1976
B 484,482	3,994,017	Mar. 23, 1976	Nov. 23, 1976
B 485,051	3,992,418	Feb. 17, 1976	Nov. 16, 1976
B 485,060	3,983,067	Feb. 17, 1976	Sep. 28, 1976
B 485,169	3,989,791	Mar. 16, 1976	Nov. 2, 1976
B 485,401	3,985,859	Jan. 27, 1976	Oct. 12, 1976
B 485,575	3,996,565	Feb. 24, 1976	Dec. 7, 1976
B 486,280	3,983,130	Feb. 3, 1976	Sep. 28, 1976
B 486,614	3,995,835	Feb. 17, 1976	Dec. 7, 1976
B 486,828	3,989,651	Mar. 2, 1976	Nov. 2, 1976
B 487,062	D 241,256	Feb. 10, 1976	Nov. 9, 1976
B 487,133	3,989,826	Jan. 27, 1976	Nov. 2, 1976
B 487,260	3,990,610	Jan. 27, 1976	Nov. 9, 1976
B 487,411	3,983,579	Feb. 24, 1976	Sep. 28, 1976
B 487,427	3,995,788	Mar. 2, 1976	Dec. 7, 1976
B 488,111	3,985,765	Jan. 13, 1976	Oct. 12, 1976
B 488,395	3,982,245	Jan. 27, 1976	Sep. 21, 1976
B 488,634	3,982,158	Jan. 20, 1976	Sep. 21, 1976
B 488,756	3,991,810	Mar. 16, 1976	Nov. 16, 1976
B 489,328	3,990,088	Jan. 20, 1976	Nov. 2, 1976
B 489,331	3,996,175	Feb. 17, 1976	Dec. 7, 1976
B 489,685	3,984,085	Feb. 24, 1976	Oct. 5, 1976
B 490,067	3,986,600	Jan. 27, 1976	Oct. 19, 1976
B 490,589	3,990,680	Feb. 3, 1976	Nov. 9, 1976
B 490,623	3,996,964	Mar. 2, 1976	Dec. 14, 1976
B 490,647	3,985,196	Feb. 24, 1976	Oct. 12, 1976
B 490,806	3,989,486	Feb. 3, 1976	Nov. 2, 1976
B 490,946	3,993,652	Feb. 17, 1976	Nov. 23, 1976
B 490,995	3,995,031	Feb. 3, 1976	Nov. 30, 1976
B 491,032	3,981,892	Feb. 10, 1976	Sep. 21, 1976
B 491,052	3,985,790	Mar. 2, 1976	Oct. 12, 1976
B 491,111	3,997,916	Feb. 17, 1976	Dec. 14, 1976
B 491,455	3,991,167	Feb. 3, 1976	Nov. 9, 1976
B 491,501	3,984,914	Jan. 13, 1976	Oct. 12, 1976
B 491,673	3,994,770	Feb. 17, 1976	Nov. 30, 1976
B 491,776	3,986,298	Mar. 16, 1976	Oct. 19, 1976
B 491,883	3,984,412	Feb. 3, 1976	Oct. 5, 1976
B 491,906	D 242,223	Feb. 10, 1976	Nov. 9, 1976
B 492,039	3,997,541	Feb. 24, 1976	Dec. 14, 1976
B 492,120	3,995,692	Feb. 24, 1976	Dec. 7, 1976
B 492,301	3,981,073	Jan. 13, 1976	Sep. 21, 1976
B 492,688	3,983,415	Jan. 20, 1976	Sep. 28, 1976
B 492,902	3,993,859	Feb. 24, 1976	Nov. 23, 1976
B 492,946	3,991,303	Jan. 27, 1976	Nov. 9, 1976
B 493,370	3,984,792	Mar. 16, 1976	Oct. 5, 1976
B 493,501	3,988,061	Feb. 3, 1976	Oct. 26, 1976
B 493,955	3,989,830	Mar. 9, 1976	Nov. 2, 1976
B 493,981	3,990,165	Mar. 9, 1976	Nov. 9, 1976
B 494,234	3,983,808	Feb. 10, 1976	Oct. 5, 1976
B 494,383	3,991,289	Feb. 3, 1976	Nov. 9, 1976
B 494,669	3,991,104	Feb. 3, 1976	Nov. 9, 1976
B 494,691	3,987,457	Mar. 16, 1976	Oct. 19, 1976
B 494,806	3,989,210	Feb. 3, 1976	Nov. 2, 1976
B 494,944	3,992,469	Feb. 17, 1976	Nov. 16, 1976
B 495,402	3,983,988	Feb. 17, 1976	Oct. 5, 1976
B 495,489	3,984,571	Feb. 3, 1976	Oct. 5, 1976
B 495,550	3,993,666	Feb. 3, 1976	Nov. 23, 1976
B 495,554	3,993,665	Feb. 3, 1976	Nov. 23, 1976
B 495,759	3,989,998	Feb. 3, 1976	Nov. 2, 1976
B 495,903	3,995,997	Feb. 17, 1976	Dec. 7, 1976
B 496,430	3,991,140	Feb. 10, 1976	Nov. 9, 1976
B 496,431	3,985,894	Jan. 13, 1976	Oct. 12, 1976
B 496,487	3,982,261	Jan. 20, 1976	Sep. 21, 1976
B 496,500	3,985,962	Feb. 3, 1976	Oct. 12, 1976
B 496,502	3,987,444	Jan. 20, 1976	Oct. 19, 1976
B 496,999	3,983,804	Jan. 27, 1976	Oct. 5, 1976
B 497,021	3,985,039	Jan. 13, 1976	Oct. 12, 1976
B 497,194	3,988,267	Feb. 3, 1976	Oct. 26, 1976
B 497,292	3,994,052	Feb. 3, 1976	Nov. 30, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE	DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 497,473	3,990,839	Feb. 3, 1976	Nov. 9, 1976	B 510,855	3,981,059	Jan. 27, 1976	Sep. 21, 1976
B 497,584	3,988,184	Feb. 24, 1976	Oct. 26, 1976	B 510,998	3,992,336	Feb. 10, 1976	Nov. 16, 1976
B 497,702	3,996,589	Mar. 2, 1976	Dec. 7, 1976	B 511,099	3,990,162	Feb. 3, 1976	Nov. 9, 1976
B 497,780	3,997,500	Feb. 24, 1976	Dec. 14, 1976	B 511,156	3,981,364	Jan. 27, 1976	Sep. 21, 1976
B 497,853	3,987,934	Feb. 17, 1976	Oct. 26, 1976	B 511,346	3,984,072	Jan. 27, 1976	Oct. 5, 1976
B 497,960	3,991,325	Jan. 20, 1976	Nov. 9, 1976	B 511,407	3,981,485	Feb. 10, 1976	Sep. 21, 1976
B 498,775	3,993,868	Mar. 2, 1976	Nov. 23, 1976	B 511,454	3,982,333	Feb. 24, 1976	Sep. 28, 1976
B 498,205	3,989,611	Feb. 10, 1976	Nov. 2, 1976	B 511,885	3,981,346	Jan. 27, 1976	Sep. 21, 1976
B 498,500	3,982,241	Jan. 20, 1976	Sep. 21, 1976	B 511,886	3,989,991	Feb. 3, 1976	Nov. 2, 1976
B 498,775	3,993,868	Mar. 2, 1976	Nov. 23, 1976	B 511,909	3,981,183	Feb. 17, 1976	Sep. 21, 1976
B 498,820	3,996,670	Mar. 9, 1976	Dec. 14, 1976	B 512,324	3,985,084	Feb. 17, 1976	Oct. 12, 1976
B 498,951	3,996,907	Mar. 2, 1976	Dec. 14, 1976	B 512,547	3,984,193	Jan. 13, 1976	Oct. 5, 1976
B 499,171	3,985,192	Jan. 27, 1976	Oct. 12, 1976	B 512,745	3,981,294	Jan. 13, 1976	Sep. 21, 1976
B 499,209	3,995,907	Feb. 24, 1976	Dec. 7, 1976	B 512,818	3,997,363	Apr. 6, 1976	Dec. 14, 1976
B 499,227	3,981,344	Jan. 27, 1976	Sep. 21, 1976	B 512,849	3,982,141	Feb. 3, 1976	Sep. 21, 1976
B 499,352	3,981,391	Jan. 27, 1976	Sep. 21, 1976	B 512,964	3,995,279	Feb. 10, 1976	Nov. 30, 1976
B 499,718	3,990,058	Jan. 27, 1976	Nov. 2, 1976	B 513,014	3,991,113	Feb. 10, 1976	Nov. 9, 1976
B 500,171	3,997,262	Mar. 30, 1976	Dec. 14, 1976	B 513,027	3,995,143	Feb. 17, 1976	Nov. 30, 1976
B 500,176	3,995,316	Feb. 3, 1976	Nov. 30, 1976	B 513,280	3,988,211	Jan. 20, 1976	Oct. 26, 1976
B 500,408	D 242,721	Mar. 16, 1976	Dec. 14, 1976	B 513,368	3,982,138	Feb. 3, 1976	Sep. 21, 1976
B 500,945	3,996,817	Feb. 24, 1976	Dec. 14, 1976	B 513,706	3,986,064	Jan. 13, 1976	Oct. 12, 1976
B 500,981	3,984,681	Jan. 27, 1976	Oct. 5, 1976	B 513,756	3,993,869	Feb. 3, 1976	Nov. 23, 1976
B 501,122	3,981,385	Feb. 17, 1976	Sep. 21, 1976	B 513,789	3,981,599	Feb. 3, 1976	Sep. 21, 1976
B 501,181	3,984,761	Feb. 10, 1976	Oct. 5, 1976	B 514,687	3,986,522	Jan. 27, 1976	Oct. 19, 1976
B 501,253	3,994,015	Feb. 3, 1976	Nov. 23, 1976	B 515,135	3,990,085	Feb. 17, 1976	Nov. 2, 1976
B 501,317	3,985,643	Jan. 13, 1976	Oct. 12, 1976	B 515,303	3,987,939	Jan. 20, 1976	Oct. 26, 1976
B 501,415	3,982,051	Jan. 13, 1976	Sep. 21, 1976	B 515,452	3,995,243	Feb. 10, 1976	Nov. 30, 1976
B 501,540	3,985,694	Jan. 13, 1976	Oct. 12, 1976	B 515,455	3,982,149	Jan. 27, 1976	Sep. 21, 1976
B 501,993	3,981,606	Jan. 13, 1976	Sep. 21, 1976	B 515,908	3,984,676	Jan. 20, 1976	Oct. 5, 1976
B 502,289	3,982,274	Jan. 13, 1976	Sep. 21, 1976	B 516,002	3,988,638	Jan. 13, 1976	Oct. 26, 1976
B 502,381	D 242,231	Mar. 16, 1976	Nov. 9, 1976	B 516,032	3,986,634	Jan. 27, 1976	Oct. 19, 1976
B 502,540	3,983,698	Jan. 13, 1976	Oct. 5, 1976	B 516,047	3,985,741	Feb. 10, 1976	Oct. 12, 1976
B 502,571	D 242,433	Apr. 6, 1976	Nov. 23, 1976	B 516,060	3,983,572	Feb. 17, 1976	Sep. 28, 1976
B 502,589	3,989,652	Jan. 27, 1976	Nov. 2, 1976	B 516,069	3,986,208	Mar. 16, 1976	Oct. 12, 1976
B 502,652	3,989,186	Feb. 24, 1976	Nov. 2, 1976	B 516,296	3,984,404	Feb. 3, 1976	Oct. 5, 1976
B 502,667	3,991,431	Feb. 24, 1976	Nov. 16, 1976	B 516,537	3,996,784	Feb. 17, 1976	Dec. 14, 1976
B 502,973	3,982,161	Jan. 27, 1976	Sep. 21, 1976	B 516,564	3,993,931	Feb. 17, 1976	Nov. 23, 1976
B 502,993	3,992,489	Feb. 17, 1976	Nov. 16, 1976	B 516,609	3,994,486	Feb. 24, 1976	Nov. 30, 1976
B 503,029	3,986,879	Jan. 27, 1976	Oct. 19, 1976	B 516,804	3,991,209	Mar. 23, 1976	Nov. 9, 1976
B 503,436	3,988,819	Feb. 24, 1976	Nov. 2, 1976	B 516,825	3,988,885	Feb. 3, 1976	Nov. 2, 1976
B 503,579	3,989,680	Feb. 10, 1976	Nov. 2, 1976	B 517,762	3,986,065	Mar. 16, 1976	Oct. 12, 1976
B 503,618	3,997,782	Mar. 9, 1976	Dec. 14, 1976	B 518,226	3,993,509	Feb. 10, 1976	Nov. 23, 1976
B 503,742	3,989,756	Feb. 17, 1976	Nov. 2, 1976	B 518,656	3,989,732	Feb. 17, 1976	Nov. 2, 1976
B 503,780	3,990,055	Mar. 16, 1976	Nov. 2, 1976	B 518,859	3,989,971	Feb. 3, 1976	Nov. 2, 1976
B 503,817	3,988,307	Jan. 13, 1976	Oct. 26, 1976	B 518,999	3,990,323	Feb. 3, 1976	Nov. 9, 1976
B 504,056	3,993,923	Feb. 24, 1976	Nov. 23, 1976	B 519,095	3,993,621	Feb. 24, 1976	Nov. 23, 1976
B 504,061	3,987,534	Mar. 16, 1976	Oct. 26, 1976	B 519,377	3,987,223	Jan. 27, 1976	Oct. 19, 1976
B 504,169	3,981,219	Jan. 13, 1976	Sep. 21, 1976	B 519,446	3,985,815	Feb. 24, 1976	Oct. 12, 1976
B 504,404	3,996,499	Feb. 24, 1976	Dec. 7, 1976	B 519,485	3,991,134	Feb. 10, 1976	Nov. 9, 1976
B 504,778	3,986,650	Feb. 24, 1976	Oct. 19, 1976	B 519,486	3,992,481	Feb. 17, 1976	Nov. 16, 1976
B 504,877	3,997,564	Feb. 24, 1976	Dec. 14, 1976	B 519,487	3,992,337	Feb. 17, 1976	Nov. 16, 1976
B 504,899	3,991,273	Mar. 9, 1976	Nov. 9, 1976	B 519,599	3,995,350	Feb. 17, 1976	Dec. 7, 1976
B 505,126	3,981,745	Feb. 10, 1976	Sep. 21, 1976	B 519,932	3,988,618	Feb. 3, 1976	Oct. 26, 1976
B 505,689	3,987,631	Mar. 2, 1976	Oct. 26, 1976	B 519,979	3,982,067	Feb. 3, 1976	Sep. 21, 1976
B 505,813	3,985,175	Jan. 13, 1976	Oct. 12, 1976	B 520,063	3,989,934	Mar. 2, 1976	Nov. 2, 1976
B 506,144	3,991,147	Feb. 10, 1976	Nov. 9, 1976	B 520,075	3,989,935	Feb. 24, 1976	Nov. 2, 1976
B 506,148	3,988,319	Feb. 3, 1976	Oct. 26, 1976	B 520,076	3,989,936	Mar. 2, 1976	Nov. 2, 1976
B 506,167	3,990,652	Feb. 10, 1976	Nov. 9, 1976	B 520,082	3,989,937	Mar. 23, 1976	Nov. 2, 1976
B 506,286	3,982,085	Jan. 20, 1976	Sep. 21, 1976	B 520,256	3,985,730	Jan. 13, 1976	Oct. 12, 1976
B 506,461	3,987,348	Jan. 20, 1976	Oct. 19, 1976	B 520,534	3,997,119	Feb. 17, 1976	Dec. 14, 1976
B 506,566	3,985,402	Jan. 20, 1976	Oct. 12, 1976	B 520,277	3,995,635	Feb. 17, 1976	Dec. 7, 1976
B 506,648	3,994,857	Feb. 3, 1976	Nov. 30, 1976	B 520,341	3,992,028	Mar. 16, 1976	Nov. 16, 1976
B 506,744	3,981,176	Jan. 13, 1976	Sep. 21, 1976	B 520,384	3,986,592	Jan. 27, 1976	Oct. 19, 1976
B 506,916	3,986,140	Feb. 3, 1976	Oct. 12, 1976	B 520,514	3,988,308	Mar. 9, 1976	Oct. 26, 1976
B 506,926	3,993,232	Feb. 17, 1976	Nov. 23, 1976	B 520,543	3,986,768	Jan. 27, 1976	Oct. 19, 1976
B 507,087	3,991,389	Feb. 17, 1976	Nov. 9, 1976	B 520,613	3,991,341	Mar. 16, 1976	Nov. 9, 1976
B 507,396	3,995,167	Feb. 10, 1976	Nov. 30, 1976	B 520,924	3,982,113	Jan. 27, 1976	Sep. 21, 1976
B 507,476	3,994,680	Feb. 10, 1976	Nov. 30, 1976	B 520,928	3,983,617	Jan. 13, 1976	Oct. 5, 1976
B 507,647	3,982,240	Jan. 27, 1976	Sep. 21, 1976	B 521,044	3,983,435	Feb. 24, 1976	Sep. 28, 1976
B 508,118	3,992,283	Feb. 17, 1976	Nov. 16, 1976	B 521,045	3,983,433	Feb. 24, 1976	Sep. 28, 1976
B 508,119	3,992,285	Feb. 17, 1976	Nov. 16, 1976	B 521,046	3,983,434	Feb. 24, 1976	Sep. 28, 1976
B 508,369	3,985,847	Jan. 13, 1976	Oct. 12, 1976	B 521,125	3,994,865	Feb. 10, 1976	Nov. 30, 1976
B 508,817	3,989,891	Feb. 3, 1976	Nov. 2, 1976	B 521,126	3,997,510	Feb. 10, 1976	Dec. 14, 1976
B 508,878	3,994,117	Feb. 3, 1976	Nov. 30, 1976	B 521,127	3,996,201	Feb. 17, 1976	Dec. 7, 1976
B 508,940	3,981,321	Feb. 17, 1976	Sep. 21, 1976	B 521,128	3,997,511	Feb. 10, 1976	Dec. 14, 1976
B 508,961	3,987,477	Feb. 3, 1976	Oct. 19, 1976	B 521,324	3,983,143	Jan. 27, 1976	Sep. 28, 1976
B 509,043	3,996,767	Feb. 24, 1976	Dec. 14, 1976	B 521,480	3,982,665	Jan. 13, 1976	Sep. 28, 1976
B 509,185	3,989,996	Feb. 3, 1976	Nov. 2, 1976	B 521,600	3,981,458	Jan. 27, 1976	Sep. 21, 1976
B 509,238	3,982,399	Feb. 24, 1976	Sep. 28, 1976	B 521,620	3,983,749	Jan. 27, 1976	Oct. 5, 1976
B 509,474	3,997,260	Feb. 17, 1976	Dec. 14, 1976	B 521,643	3,997,567	Mar. 2, 1976	Dec. 14, 1976
B 509,606	3,989,986	Feb. 3, 1976	Nov. 2, 1976	B 521,711	3,989,835	Feb. 10, 1976	Nov. 2, 1976
B 510,281	3,993,215	Mar. 9, 1976	Nov. 23, 1976	B 521,793	3,996,981	Feb. 24, 1976	Dec. 14, 1976
B 510,346	D 242,207	Feb. 10, 1976	Nov. 9, 1976	B 521,984	3,983,220	Feb. 17, 1976	Sep. 28, 1976
B 510,521	3,990,656	Mar. 2, 1976	Nov. 9, 1976	B 521,986	3,981,607	Feb. 3, 1976	Sep. 21, 1976
B 510,588	3,981,539	Jan. 27, 1976	Sep. 21, 1976	B 522,009	3,995,444	Feb. 17, 1976	Dec. 7, 1976
B 510,677	3,989,541	Feb. 24, 1976	Nov. 2, 1976	B 522,038	3,993,119	Feb. 3, 1976	Nov. 23, 1976
B 510,850	3,989,841	Feb. 3, 1976	Nov. 2, 1976	B 522,227	3,992,904	Mar. 30, 1976	Nov. 23, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE	DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 522,309	3,991,603	Feb. 3, 1976	Nov. 16, 1976	B 537,709	3,981,368	Jan. 13, 1976	Sep. 21, 1976
B 522,354	3,984,959	Jan. 20, 1976	Oct. 12, 1976	B 537,711	3,985,748	Jan. 13, 1976	Oct. 12, 1976
B 522,567	3,996,238	Feb. 17, 1976	Dec. 7, 1976	B 537,722	3,985,423	Feb. 3, 1976	Oct. 12, 1976
B 522,577	3,982,123	Jan. 27, 1976	Sep. 21, 1976	B 537,903	3,986,492	Jan. 20, 1976	Oct. 19, 1976
B 523,696	3,986,071	Jan. 13, 1976	Oct. 12, 1976	B 538,472	3,992,884	Feb. 3, 1976	Nov. 23, 1976
B 523,885	3,981,040	Feb. 17, 1976	Sep. 21, 1976	B 538,491	3,982,928	Feb. 17, 1976	Sep. 28, 1976
B 523,952	3,988,707	Mar. 23, 1976	Oct. 26, 1976	B 538,686	3,982,199	Jan. 13, 1976	Sep. 21, 1976
B 524,026	3,992,206	Feb. 10, 1976	Nov. 16, 1976	B 538,753	3,993,642	Feb. 10, 1976	Nov. 23, 1976
B 524,121	3,982,536	Feb. 3, 1976	Sep. 28, 1976	B 539,374	3,996,229	Mar. 9, 1976	Dec. 7, 1976
B 524,179	3,985,872	Jan. 13, 1976	Oct. 12, 1976	B 539,746	3,983,423	Feb. 17, 1976	Sep. 28, 1976
B 524,464	3,985,580	Feb. 10, 1976	Oct. 12, 1976	B 540,078	3,984,701	Jan. 13, 1976	Oct. 5, 1976
B 525,133	3,996,481	Mar. 23, 1976	Dec. 7, 1976	B 540,218	3,986,108	Feb. 10, 1976	Oct. 12, 1976
B 525,809	3,985,040	Feb. 24, 1976	Oct. 12, 1976	B 540,632	3,981,600	Jan. 13, 1976	Sep. 21, 1976
B 525,961	3,985,557	Jan. 13, 1976	Oct. 12, 1976	B 540,767	3,986,010	Mar. 16, 1976	Oct. 12, 1976
B 526,106	3,990,073	Jan. 27, 1976	Nov. 2, 1976	B 540,872	3,982,135	Jan. 20, 1976	Sep. 21, 1976
B 526,190	3,982,129	Feb. 17, 1976	Sep. 21, 1976	B 541,015	3,993,208	Jan. 27, 1976	Nov. 23, 1976
B 526,289	3,992,641	Feb. 24, 1976	Nov. 16, 1976	B 541,376	3,981,690	Feb. 17, 1976	Sep. 21, 1976
B 526,388	3,992,017	Feb. 3, 1976	Nov. 16, 1976	B 541,415	3,982,080	Feb. 3, 1976	Sep. 21, 1976
B 526,445	3,984,978	Jan. 20, 1976	Oct. 12, 1976	B 541,464	3,995,424	Feb. 17, 1976	Dec. 7, 1976
B 526,510	3,989,708	Jan. 20, 1976	Nov. 2, 1976	B 541,496	3,982,232	Jan. 27, 1976	Sep. 21, 1976
B 526,997	3,985,695	Jan. 13, 1976	Oct. 12, 1976	B 541,517	3,986,156	Jan. 13, 1976	Oct. 12, 1976
B 527,054	3,981,559	Feb. 17, 1976	Sep. 21, 1976	B 541,710	3,994,472	Feb. 24, 1976	Nov. 30, 1976
B 527,187	3,995,202	Feb. 17, 1976	Nov. 30, 1976	B 542,135	3,986,939	Feb. 10, 1976	Oct. 19, 1976
B 527,669	3,982,206	Jan. 13, 1976	Sep. 21, 1976	B 542,158	3,981,886	Jan. 13, 1976	Sep. 21, 1976
B 527,693	3,995,233	Feb. 3, 1976	Nov. 30, 1976	B 542,226	3,993,748	Feb. 24, 1976	Nov. 23, 1976
B 527,788	D 242,337	Feb. 10, 1976	Nov. 16, 1976	B 543,078	3,995,687	Feb. 17, 1976	Dec. 7, 1976
B 527,999	3,981,682	Feb. 3, 1976	Sep. 21, 1976	B 543,941	3,985,528	Jan. 13, 1976	Oct. 12, 1976
B 528,303	3,991,023	Feb. 10, 1976	Nov. 9, 1976	B 544,034	3,997,175	Feb. 17, 1976	Dec. 14, 1976
B 528,401	3,991,619	Feb. 3, 1976	Nov. 16, 1976	B 544,476	3,993,585	Feb. 24, 1976	Nov. 23, 1976
B 528,756	3,990,476	Feb. 3, 1976	Nov. 9, 1976	B 544,899	3,994,962	Feb. 17, 1976	Nov. 30, 1976
B 528,761	3,982,221	Feb. 10, 1976	Sep. 21, 1976	B 544,961	3,983,492	Jan. 13, 1976	Sep. 28, 1976
B 528,962	3,989,666	Feb. 24, 1976	Nov. 2, 1976	B 545,050	3,982,073	Jan. 20, 1976	Sep. 21, 1976
B 528,966	3,989,667	Feb. 24, 1976	Nov. 2, 1976	B 545,464	3,992,387	Feb. 10, 1976	Nov. 16, 1976
B 529,156	3,989,158	Jan. 13, 1976	Nov. 2, 1976	B 545,630	3,981,337	Jan. 27, 1976	Sep. 21, 1976
B 529,659	3,996,875	Feb. 24, 1976	Dec. 14, 1976	B 545,935	3,990,337	Jan. 27, 1976	Nov. 9, 1976
B 529,836	3,994,345	Feb. 3, 1976	Nov. 30, 1976	B 545,945	3,995,260	Jan. 27, 1976	Nov. 30, 1976
B 529,974	3,987,098	Feb. 17, 1976	Oct. 19, 1976	B 546,295	3,987,070	Jan. 20, 1976	Oct. 19, 1976
B 530,174	3,993,635	Feb. 24, 1976	Nov. 23, 1976	B 546,426	3,982,063	Jan. 27, 1976	Sep. 21, 1976
B 530,255	3,996,103	Mar. 2, 1976	Dec. 7, 1976	B 546,631	3,983,729	Feb. 3, 1976	Oct. 5, 1976
B 530,318	3,985,752	Jan. 13, 1976	Oct. 12, 1976	B 546,665	3,990,062	Jan. 20, 1976	Nov. 2, 1976
B 530,605	3,989,064	Feb. 3, 1976	Nov. 2, 1976	B 546,911	3,981,058	Jan. 13, 1976	Sep. 21, 1976
B 530,813	3,986,131	Feb. 17, 1976	Oct. 12, 1976	B 546,922	3,987,742	Mar. 16, 1976	Oct. 26, 1976
B 530,925	3,983,161	Feb. 24, 1976	Sep. 28, 1976	B 547,547	3,997,670	Feb. 24, 1976	Dec. 14, 1976
B 531,096	3,984,415	Feb. 10, 1976	Oct. 5, 1976	B 547,994	3,990,081	Jan. 20, 1976	Nov. 2, 1976
B 531,267	3,997,040	Feb. 24, 1976	Dec. 14, 1976	B 548,028	3,991,517	Feb. 3, 1976	Nov. 16, 1976
B 531,425	3,992,595	Feb. 3, 1976	Nov. 16, 1976	B 548,058	3,983,050	Feb. 17, 1976	Sep. 28, 1976
B 531,566	3,997,820	Mar. 16, 1976	Dec. 14, 1976	B 548,155	3,981,477	Jan. 13, 1976	Sep. 21, 1976
B 531,686	3,990,017	Mar. 23, 1976	Nov. 2, 1976	B 548,440	3,993,401	Feb. 3, 1976	Nov. 23, 1976
B 531,753	3,988,843	Mar. 2, 1976	Nov. 2, 1976	B 548,302	3,983,414	Feb. 17, 1976	Sep. 28, 1976
B 531,929	3,986,067	Jan. 20, 1976	Oct. 12, 1976	B 548,440	3,993,401	Feb. 3, 1976	Nov. 23, 1976
B 532,005	3,992,397	Feb. 24, 1976	Nov. 16, 1976	B 548,462	D 242,283	Feb. 10, 1976	Nov. 9, 1976
B 532,319	3,990,292	Feb. 3, 1976	Nov. 9, 1976	B 548,688	3,995,984	Mar. 9, 1976	Dec. 7, 1976
B 532,326	3,993,959	Mar. 23, 1976	Nov. 23, 1976	B 548,719	3,990,553	Feb. 17, 1976	Nov. 9, 1976
B 532,424	D 242,292	Feb. 10, 1976	Nov. 9, 1976	B 549,198	3,981,975	Jan. 13, 1976	Sep. 21, 1976
B 532,476	3,992,756	Feb. 3, 1976	Nov. 23, 1976	B 549,244	3,981,125	Jan. 27, 1976	Sep. 21, 1976
B 532,901	3,984,318	Jan. 13, 1976	Oct. 5, 1976	B 549,394	3,981,611	Jan. 27, 1976	Sep. 21, 1976
B 532,969	3,981,706	Jan. 13, 1976	Sep. 21, 1976	B 549,931	3,986,141	Jan. 20, 1976	Oct. 12, 1976
B 533,056	3,983,969	Jan. 13, 1976	Oct. 5, 1976	B 549,964	3,995,899	Feb. 24, 1976	Dec. 7, 1976
B 533,454	3,996,566	Mar. 2, 1976	Dec. 7, 1976	B 550,693	3,982,194	Jan. 20, 1976	Sep. 21, 1976
B 533,580	3,982,255	Feb. 3, 1976	Sep. 21, 1976	B 550,744	3,993,550	Feb. 17, 1976	Nov. 23, 1976
B 533,734	3,984,799	Jan. 27, 1976	Oct. 5, 1976	B 551,133	3,996,740	Mar. 2, 1976	Dec. 14, 1976
B 533,968	3,986,576	Jan. 27, 1976	Oct. 19, 1976	B 551,463	3,996,254	Feb. 17, 1976	Dec. 7, 1976
B 534,016	3,983,381	Feb. 3, 1976	Sep. 28, 1976	B 551,527	3,982,599	Jan. 13, 1976	Sep. 28, 1976
B 534,313	3,981,675	Jan. 27, 1976	Sep. 21, 1976	B 551,809	3,996,743	Feb. 24, 1976	Dec. 14, 1976
B 534,314	3,981,786	Feb. 10, 1976	Sep. 21, 1976	B 551,952	Re. 29,059	Mar. 2, 1976	Dec. 7, 1976
B 534,333	3,981,480	Feb. 17, 1976	Sep. 21, 1976	B 552,006	3,992,129	Feb. 3, 1976	Nov. 16, 1976
B 534,334	D 242,722	Mar. 16, 1976	Dec. 14, 1976	B 552,489	3,994,864	Feb. 10, 1976	Nov. 30, 1976
B 534,443	3,989,970	Jan. 27, 1976	Nov. 2, 1976	B 552,498	3,983,139	Jan. 13, 1976	Sep. 28, 1976
B 534,574	3,995,624	Feb. 24, 1976	Dec. 7, 1976	B 552,629	3,994,773	Mar. 23, 1976	Nov. 30, 1976
B 534,591	3,991,141	Feb. 17, 1976	Nov. 9, 1976	B 552,932	3,989,292	Feb. 3, 1976	Nov. 2, 1976
B 534,767	3,982,180	Feb. 3, 1976	Sep. 21, 1976	B 553,460	3,990,019	Feb. 3, 1976	Nov. 2, 1976
B 534,991	3,983,517	Jan. 27, 1976	Sep. 28, 1976	B 553,584	3,992,456	Feb. 17, 1976	Nov. 16, 1976
B 535,076	3,981,718	Jan. 20, 1976	Sep. 21, 1976	B 554,283	3,981,152	Jan. 27, 1976	Sep. 21, 1976
B 535,386	3,981,150	Jan. 13, 1976	Sep. 21, 1976	B 554,594	3,985,960	Jan. 20, 1976	Oct. 12, 1976
B 535,391	3,981,386	Jan. 27, 1976	Sep. 21, 1976	B 554,939	3,994,013	Feb. 10, 1976	Nov. 23, 1976
B 535,411	3,990,543	Feb. 24, 1976	Nov. 9, 1976	B 555,437	3,991,152	Feb. 3, 1976	Nov. 9, 1976
B 535,437	3,997,555	Feb. 24, 1976	Dec. 14, 1976	B 555,456	3,993,423	Mar. 30, 1976	Nov. 23, 1976
B 535,448	3,997,123	Mar. 16, 1976	Dec. 14, 1976	B 555,772	3,982,641	Jan. 13, 1976	Sep. 28, 1976
B 535,466	3,981,309	Jan. 27, 1976	Sep. 21, 1976	B 556,057	3,985,349	Jan. 13, 1976	Oct. 12, 1976
B 535,813	3,981,819	Jan. 27, 1976	Sep. 21, 1976	B 556,496	3,990,244	Mar. 16, 1976	Nov. 9, 1976
B 535,928	3,981,466	Jan. 13, 1976	Sep. 21, 1976	B 556,897	3,992,972	Feb. 3, 1976	Nov. 23, 1976
B 536,009	3,982,112	Jan. 27, 1976	Sep. 21, 1976	B 557,153	3,991,603	Feb. 3, 1976	Nov. 16, 1976
B 536,082	3,997,783	Mar. 16, 1976	Dec. 14, 1976	B 557,299	3,990,357	Feb. 3, 1976	Nov. 9, 1976
B 536,511	3,995,989	Mar. 9, 1976	Dec. 7, 1976	B 557,621	3,990,800	Feb. 3, 1976	Nov. 9, 1976
B 536,675	3,985,773	Jan. 20, 1976	Oct. 12, 1976	B 557,856	3,991,019	Feb. 10, 1976	Nov. 9, 1976
B 536,935	3,985,729	Jan. 13, 1976	Oct. 12, 1976	B 558,220	3,990,009	Jan. 27, 1976	Nov. 2, 1976
B 537,102	3,981,829	Jan. 13, 1976	Sep. 21, 1976	B 558,251	3,981,289	Jan. 13, 1976	Sep. 21, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE	DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 558,813	3,989,188	Feb. 3, 1976	Nov. 2, 1976	B 569,859	3,994,160	Mar. 9, 1976	Nov. 30, 1976
B 558,818	3,983,762	Jan. 13, 1976	Oct. 5, 1976	B 570,172	3,987,763	Feb. 3, 1976	Oct. 26, 1976
B 558,819	3,990,160	Feb. 3, 1976	Nov. 9, 1976	B 570,862	3,991,639	Feb. 24, 1976	Nov. 16, 1976
B 558,973	3,981,126	Feb. 10, 1976	Sep. 21, 1976	B 571,219	3,991,388	Feb. 24, 1976	Nov. 9, 1976
B 559,111	3,984,854	Feb. 24, 1976	Oct. 5, 1976	B 571,659	3,995,186	Apr. 13, 1976	Nov. 30, 1976
B 559,697	3,995,770	Mar. 16, 1976	Dec. 7, 1976	B 572,642	3,990,715	Feb. 10, 1976	Nov. 9, 1976
B 559,737	3,984,668	Jan. 20, 1976	Oct. 5, 1976	B 573,033	3,995,224	Mar. 23, 1976	Nov. 30, 1976
B 559,954	3,982,673	Feb. 3, 1976	Sep. 28, 1976	B 574,128	3,982,961	Feb. 17, 1976	Sep. 28, 1976
B 560,261	3,987,493	Mar. 16, 1976	Oct. 19, 1976	B 574,996	3,989,718	Feb. 17, 1976	Nov. 2, 1976
B 560,488	3,989,940	Mar. 16, 1976	Nov. 2, 1976	B 575,757	3,981,170	Jan. 27, 1976	Sep. 21, 1976
B 560,717	3,982,034	Feb. 10, 1976	Sep. 21, 1976	B 575,851	3,985,826	Feb. 10, 1976	Oct. 12, 1976
B 560,765	3,983,389	Feb. 3, 1976	Sep. 28, 1976	B 576,859	3,991,526	Feb. 24, 1976	Nov. 16, 1976
B 561,062	D 242,248	Feb. 10, 1976	Nov. 9, 1976	B 576,903	3,995,032	Feb. 3, 1976	Nov. 30, 1976
B 561,387	3,985,706	Feb. 10, 1976	Oct. 12, 1976	B 578,447	3,982,658	Jan. 20, 1976	Sep. 28, 1976
B 561,712	3,992,126	Feb. 17, 1976	Nov. 16, 1976	B 579,104	3,982,081	Jan. 27, 1976	Sep. 21, 197
B 561,732	3,991,460	Feb. 3, 1976	Nov. 16, 1976	B 579,116	3,986,227	Feb. 3, 1976	Oct. 19, 1976
B 561,764	3,984,634	Jan. 27, 1976	Oct. 5, 1976	B 579,806	3,995,318	Feb. 3, 1976	Nov. 30, 1976
B 561,784	3,984,710	Jan. 27, 1976	Oct. 5, 1976	B 580,826	3,988,391	Feb. 17, 1976	Oct. 26, 1976
B 562,462	3,985,836	Jan. 13, 1976	Oct. 12, 1976	B 580,921	3,984,054	Jan. 13, 1976	Oct. 5, 1976
B 562,698	3,983,972	Jan. 13, 1976	Oct. 5, 1976	B 583,051	3,990,714	Feb. 3, 1976	Nov. 9, 1976
B 562,813	3,985,491	Feb. 3, 1976	Oct. 12, 1976	B 583,089	3,982,174	Jan. 27, 1976	Sep. 21, 1976
B 563,070	3,996,230	Mar. 9, 1976	Dec. 7, 1976	B 583,712	3,995,064	Feb. 10, 1976	Nov. 30, 1976
B 563,244	3,983,562	Jan. 27, 1976	Sep. 28, 1976	B 584,520	3,981,149	Jan. 27, 1976	Sep. 21, 1976
B 563,301	3,995,589	Feb. 17, 1976	Dec. 7, 1976	B 585,247	3,989,914	Feb. 3, 1976	Nov. 2, 1976
B 563,412	3,992,127	Feb. 24, 1976	Nov. 16, 1976	B 585,731	3,993,603	Feb. 3, 1976	Nov. 23, 1976
B 563,722	3,990,925	Jan. 13, 1976	Nov. 9, 1976	B 586,215	3,985,302	Jan. 20, 1976	Oct. 12, 1976
B 563,780	3,987,769	Feb. 3, 1976	Oct. 26, 1976	B 586,380	3,983,885	Mar. 2, 1976	Oct. 5, 1976
B 564,314	3,984,996	Jan. 20, 1976	Oct. 12, 1976	B 586,387	3,981,311	Feb. 3, 1976	Sep. 21, 1976
B 565,180	3,981,685	Jan. 27, 1976	Sep. 21, 1976	B 586,663	3,992,080	Feb. 3, 1976	Nov. 16, 1976
B 565,275	3,990,299	Apr. 6, 1976	Nov. 9, 1976	B 587,118	Re. 29,067	Mar. 2, 1976	Dec. 7, 1976
B 566,464	3,996,367	Feb. 3, 1976	Dec. 7, 1976	B 587,786	3,991,204	Feb. 17, 1976	Nov. 9, 1976
B 566,572	3,988,590	Mar. 16, 1976	Oct. 26, 1976	B 589,687	3,995,349	Mar. 23, 1976	Dec. 7, 1976
B 567,058	3,985,188	Jan. 13, 1976	Oct. 12, 1976	B 589,966	3,985,828	Feb. 17, 1976	Oct. 12, 1976
B 567,158	3,988,073	Mar. 23, 1976	Oct. 26, 1976	B 590,158	3,985,163	Feb. 10, 1976	Oct. 12, 1976
B 567,207	3,991,689	Apr. 13, 1976	Nov. 16, 1976	B 590,159	3,985,164	Feb. 3, 1976	Oct. 12, 1976
B 567,435	3,995,724	Feb. 3, 1976	Dec. 7, 1976	B 592,143	3,984,713	Jan. 27, 1976	Oct. 5, 1976
B 567,854	3,985,038	Feb. 3, 1976	Oct. 12, 1976	B 596,692	3,992,349	Feb. 17, 1976	Nov. 16, 1976
B 568,226	3,992,698	Feb. 24, 1976	Nov. 16, 1976	B 657,438	3,985,701	Jan. 20, 1976	Oct. 12, 1976
B 568,770	3,982,213	Feb. 10, 1976	Sep. 21, 1976	B 747,785	3,981,899	Feb. 10, 1976	Sep. 21, 1976
B 569,125	3,986,980	Feb. 24, 1976	Oct. 19, 1976	B 843,038	3,981,785	Feb. 3, 1976	Sep. 21, 1976
B 569,519	3,993,133	Feb. 3, 1976	Nov. 23, 1976	B 848,336	3,993,752	Mar. 30, 1976	Nov. 23, 1976
B 569,646	3,985,222	Jan. 13, 1976	Oct. 12, 1976				

LIST OF REISSUE PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 14TH DAY OF DECEMBER, 1976

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

Barnes Engineering Company: *See*—
Schwarz, Frank, Re. 29,082.

Bell Telephone Laboratories, Incorporated: *See*—
Tate, Louis David, Re. 29,078.

Depetris, Lorenzo, to Smyth Europea S.p.A. Automatic machine for feeding and sewing signatures in books. Re. 29,071, Cl. 112-21.000.

Geller, Ehud, to Ives Laboratories Inc. Tablet formulation. Re. 29,076, Cl. 424-15.000.

Geller, Ehud, to Ives Laboratories Inc. Tablet formulation. Re. 29,077, Cl. 424-15.000.

Gilbert, Roswell W., to Motor Finance Corporation. Multiplier, divider and wattmeter using a switching circuit and a pulse-width and frequency modulator. Re. 29,079, Cl. 235-194.000.

Grundmann, John F., to Moog Inc. Electromagneto-mechanical actuator. Re. 29,081, Cl. 335-228.000.

International Shoe Machine Corporation: *See*—
Lindsey, William C., Re. 29,069.

Ives Laboratories Inc.: *See*—
Geller, Ehud, Re. 29,076.
Geller, Ehud, Re. 29,077.

Kiko, Frederick J., to Lorain Products Corporation. Compensated transformer circuit utilizing negative capacitance simulating circuit. Re. 29,080, Cl. 333-24.00R.

Kinney, Thomas D.; and Pickett, John E. P. Light microscopy processing apparatus. Re. 29,073, Cl. 118-7.000.

Lindsey, William C., to International Shoe Machine Corporation. Pulling over mechanism. Re. 29,069, Cl. 12-14.500.

Lorain Products Corporation: *See*—
Kiko, Frederick J., Re. 29,080.

MacEwen, George E., to Phillips Petroleum Company. Gable topped container and paperboard blank. Re. 29,074, Cl. 229-17.00G.

Mays, Ralph C. Attachment for removably supporting a partial denture. Re. 29,070, Cl. 32-5.000.

Moog Inc.: *See*—
Grundmann, John F., Re. 29,081.

Motor Finance Corporation: *See*—
Gilbert, Roswell W., Re. 29,079.

Phillips Petroleum Company: *See*—
MacEwen, George E., Re. 29,074.

Pickett, John E. P.: *See*—
Kinney, Thomas D.; and Pickett, John E. P., Re. 29,073.

Ravitts, Richard B., to Richards of Rockford. Liquid aerator. Re. 29,075, Cl. 239-16.000.

Richards of Rockford: *See*—
Ravitts, Richard B., Re. 29,075.

Schwarz, Frank, to Barnes Engineering Company. Intrusion detector. Re. 29,082, Cl. 340-258.00D.

Smyth Europea S.p.A.: *See*—
Depetris, Lorenzo, Re. 29,071.

Tate, Louis David, to Bell Telephone Laboratories, Incorporated. Key telephone system. Re. 29,078, Cl. 179-99.000.

Zondek, Klaus. Method of protecting the hulls of marine vessels from fouling. Re. 29,072, Cl. 114-222.000.

LIST OF PLANT PATENTEES

Anderson, Frederic W., to Burchell Nursery, Inc., The. Plum tree. 3,991, 12-14-76, Cl. 38.000.

Bailey, Catherine: *See*—
Dayton, Daniel F.; Mowry, James B.; Hough, L. Frederick; Bailey, Catherine; Williams, Edwin B.; Janick, Jules; Emerson, Frank H.; and Shay, J. Ralph, 3,988.

Burchell Nursery, Inc., The: *See*—
Anderson, Frederic W., 3,991.

Byrum, Roy L., to Joseph H. Hill Company. Rose plant seedling No. 71-86L. 3,990, 12-14-76, Cl. 22.000.

Dayton, Daniel F.; Mowry, James B.; Hough, L. Frederick; Bailey, Catherine; Williams, Edwin B.; Janick, Jules; Emerson, Frank H.; and Shay, J. Ralph, to Purdue Research Foundation. Apple tree: Sir Prize. 3,988, 12-14-76, Cl. 34.000.

Driscoll Strawberry Associates, Inc.: *See*—
Johnson, Harold A., Jr., 3,987.

Emerson, Frank H.: *See*—
Dayton, Daniel F.; Mowry, James B.; Hough, L. Frederick; Bailey, Catherine; Williams, Edwin B.; Janick, Jules; Emerson, Frank H.; and Shay, J. Ralph, 3,988.

Hough, L. Frederick: *See*—
Dayton, Daniel F.; Mowry, James B.; Hough, L. Frederick; Bailey, Catherine; Williams, Edwin B.; Janick, Jules; Emerson, Frank H.; and Shay, J. Ralph, 3,988.

Janick, Jules: *See*—
Dayton, Daniel F.; Mowry, James B.; Hough, L. Frederick; Bailey, Catherine; Williams, Edwin B.; Janick, Jules; Emerson, Frank H.; and Shay, J. Ralph, 3,988.

Johnson, Harold A., Jr., to Driscoll Strawberry Associates, Inc. Strawberry plant. 3,987, 12-14-76, Cl. 49.000.

Joseph H. Hill Company: *See*—
Byrum, Roy L., 3,990.

Mowry, James B.: *See*—
Dayton, Daniel F.; Mowry, James B.; Hough, L. Frederick; Bailey, Catherine; Williams, Edwin B.; Janick, Jules; Emerson, Frank H.; and Shay, J. Ralph, 3,988.

Purdue Research Foundation: *See*—
Dayton, Daniel F.; Mowry, James B.; Hough, L. Frederick; Bailey, Catherine; Williams, Edwin B.; Janick, Jules; Emerson, Frank H.; and Shay, J. Ralph, 3,988.

Shay, J. Ralph: *See*—
Dayton, Daniel F.; Mowry, James B.; Hough, L. Frederick; Bailey, Catherine; Williams, Edwin B.; Janick, Jules; Emerson, Frank H.; and Shay, J. Ralph, 3,988.

Triplett, Fay E. Grapevine. 3,989, 12-14-76, Cl. 47.000.

Williams, Edwin B.: *See*—
Dayton, Daniel F.; Mowry, James B.; Hough, L. Frederick; Bailey, Catherine; Williams, Edwin B.; Janick, Jules; Emerson, Frank H.; and Shay, J. Ralph, 3,988.

LIST OF DESIGN PATENTEES

AAI Corporation: *See*—
Barr, Irwin R., 242,711.
Barr, Irwin R., 242,712.
Barr, Irwin R., 242,713.
Barr, Irwin R., 242,714.
Barr, Irwin R., 242,715.
Barr, Irwin R., 242,716.
Barr, Irwin R., 242,717.
Barr, Irwin R., 242,718.
Barr, Irwin R., 242,719.

Adkinson, Joseph E., to Caldwell, Wilfred G. Breakfront or the like. 242,678, 12-14-76, Cl. D6-154.000.

Adkinson, Joseph E., to Caldwell, Wilfred G. Breakfront or the like. 242,679, 12-14-76, Cl. D6-154.000.

All-Tube Products Limited: *See*—
Arandjelovic, Miroslav, 242,669.

Altex Scientific, Inc.: *See*—
Major, Emery; McDonald, James L.; and McDonald, Harry R., 242,708.

Arandjelovic, Miroslav, to All-Tube Products Limited. Chair. 242,669, 12-14-76, Cl. D6-56.000.

Barr, Irwin R., to AAI Corporation. Building structure. 242,711, 12-14-76, Cl. D25-21.000.

Barr, Irwin R., to AAI Corporation. Building structure. 242,712, 12-14-76, Cl. D25-21.000.

Barr, Irwin R., to AAI Corporation. Building structure. 242,713, 12-14-76, Cl. D25-21.000.

Barr, Irwin R., to AAI Corporation. Building structure. 242,714, 12-14-76, Cl. D25-21.000.

Barr, Irwin R., to AAI Corporation. Building structure. 242,715, 12-14-76, Cl. D25-21.000.

Barr, Irwin R., to AAI Corporation. Building structure. 242,716, 12-14-76, Cl. D25-21.000.

Barr, Irwin R., to AAI Corporation. Building structure. 242,717, 12-14-76, Cl. D25-21.000.

Barr, Irwin R., to AAI Corporation. Building structure. 242,718, 12-14-76, Cl. D25-21.000.

Barr, Irwin R., to AAI Corporation. Building structure. 242,719, 12-14-76, Cl. D25-21.000.

Bass, Donald E.: *See—*
Phillips, Gary E., 242,707.

Bates, Jack A. Carpet cleaning machine. 242,686, 12-14-76, Cl. D15-54.000.

Bell, Mace, to United Technologies Corporation. Housing for motor vehicle diagnostic equipment. 242,722, 12-14-76, Cl. D26-5.00C.

Bio-Med Plastics, Inc.: *See—*
Kaufman, Jack W., 242,668.

Blizzard, Alan G.: *See—*
Craft, James Pressley, III; and Blizzard, Alan G., 242,736.

Bom, Cornelis Johannes Gerardus: *See—*
van der Lely, Ary; and Bom, Cornelis Johannes Gerardus, 242,737.

Breneman, Jack L.; and Samson, Jeffrey T., to Quaker Oats Company, The. Toy truck with plow. 242,734, 12-14-76, Cl. D34-15.0AJ.

Brentham, Jerry D. Physical exerciser. 242,732, 12-14-76, Cl. D34-5.00K.

Broberg, Dewey O., Jr. Grill cleaner. 242,687, 12-14-76, Cl. D7-184.000.

Brodie, S. Dan. Headset. 242,724, 12-14-76, Cl. D26-14.00H.

Brown, Lois R. Hold down device for securing a line or flexible member to the ground. 242,690, 12-14-76, Cl. D8-229.000.

Budd Company, The: *See—*
Eggert, Walter S., Jr., 242,699.

Cain, Bertram J.; and Whiteman, Walter R., to R. J. Reynolds Tobacco Company. Combined display and dispensing stand for cigarette packages. 242,682, 12-14-76, Cl. D6-189.000.

Caldwell, Wilfred G.: *See—*
Adkinson, Joseph E., 242,678.
Adkinson, Joseph E., 242,679.

Candler, Robert A. Skate coaster. 242,735, 12-14-76, Cl. D34-15.0AJ.

Cannon, Michael A., to Micon Industries. Electroluminescent character D. 242,741, 12-14-76, Cl. D64-12.00B.

Christine, William C.; and Watt, W. E. R., to Inpaco. Douche bag or the like. 242,742, 12-14-76, Cl. D83-1.00P.

Cleanweld Products, Inc.: *See—*
McCue, Daniel E., 242,688.

Coatney, Richard H. Combined desk set and calendar. 242,704, 12-14-76, Cl. D19-75.000.

Coats & Clark, Inc.: *See—*
Langston, Charles R., Jr., 242,745.

Colgate-Palmolive Company: *See—*
Koenigsberg, Victor, 242,691.

Consolidated Foods Corporation: *See—*
Loforese, Leonard T., 242,720.

Craft, James Pressley, III; and Blizzard, Alan G., to Thermal Hydraulics Corporation. Plant pot. 242,736, 12-14-76, Cl. D11-143.000.

Dazey Products Co.: *See—*
McNair, Samuel L., 242,675.

Drummond Scientific Company: *See—*
Kenney, James W., 242,729.

Eggert, Walter S., Jr., to Budd Company, The. Automobile. 242,699, 12-14-76, Cl. D12-91.000.

Elek, John M. Sprinkler base. 242,706, 12-14-76, Cl. D23-7.000.

Fedrigo, A. Fred. Swimming pool chlorinator. 242,705, 12-14-76, Cl. D23-3.000.

Gavin, Donna L., to Uniroyal, Inc. Child's shoe. 242,667, 12-14-76, Cl. D2-278.000.

Haas, James Gordon. Cabinet for fire extinguishers. 242,676, 12-14-76, Cl. D6-127.000.

Harris, John Madison. Combined toothbrush holder and bracket. 242,672, 12-14-76, Cl. D6-94.000.

Herr, Lewis H.; Porter, Paul W.; and Kovacs, John S., to Sperry Rand Corporation. Electronic calculator. 242,721, 12-14-76, Cl. D26-5.00C.

Inpaco: *See—*
Christine, William C.; and Watt, W. E. R., 242,742.

Jackson, Joseph Monroe, to Litton Business Telephone Systems, Inc. Pushbutton telephone shield plate. 242,723, 12-14-76, Cl. D26-14.00A.

Kabushiki Kaisha Daini Seikosha: *See—*
Osawa, Eiichi; Miyata, Midori; and Karibe, Susumu, 242,695.

Kanazawa Industries Co., Ltd.: *See—*
Okazawa, Gail, 242,726.

Karibe, Susumu: *See—*
Osawa, Eiichi; Miyata, Midori; and Karibe, Susumu, 242,695.

Kaufman, Jack W., to Bio-Med Plastics, Inc. Combined brush and sponge. 242,668, 12-14-76, Cl. D4-17.000.

Kennedy, Robert Vincent. Drafting triangle. 242,693, 12-14-76, Cl. D10-62.000.

Kenney, James W., to Drummond Scientific Company. Automatic pipette or the like. 242,729, 12-14-76, Cl. D32-2.00C.

Kewish, Thomas G. Riding helmet. 242,665, 12-14-76, Cl. D2-231.000.

Keyes, Robert A. Motor vehicle. 242,696, 12-14-76, Cl. D12-85.000.

Koenigsberg, Victor, to Colgate-Palmolive Company. Bottle. 242,691, 12-14-76, Cl. D9-91.000.

Kovacs, John S.: *See—*
Herr, Lewis H.; Porter, Paul W.; and Kovacs, John S., 242,721.

Langston, Charles R., Jr., to Coats & Clark, Inc. Yarn cone. 242,745, 12-14-76, Cl. D15-78.000.

Lee, Mary Ellen: *See—*
Sweeney, Doris; and Lee, Mary Ellen, 242,674.

Leight, Charles. Ear plug. 242,743, 12-14-76, Cl. D83-1.00J.

Litton Business Telephone Systems, Inc.: *See—*
Jackson, Joseph Monroe, 242,723.

Loforese, Leonard T., to Consolidated Foods Corporation. Combined electric plug and receptacle therefor. 242,720, 12-14-76, Cl. D26-1.00B.

Major, Emery; McDonald, James L.; and McDonald, Harry R., to Altex Scientific, Inc. Valve housing or similar article. 242,708, 12-14-76, Cl. D23-19.000.

Maune, James J. Ashtray. 242,725, 12-14-76, Cl. D27-16.000.

McCue, Daniel E., to Cleanweld Products, Inc. Self-contained brazing torch or the like. 242,688, 12-14-76, Cl. D8-30.000.

McDonald, Harry R.: *See—*
Major, Emery; McDonald, James L.; and McDonald, Harry R., 242,708.

McDonald, James L.: *See—*
Major, Emery; McDonald, James L.; and McDonald, Harry R., 242,708.

McNair, Samuel L., to Dazey Products Co. Combined support stand and power supply for cordless hair curling iron. 242,675, 12-14-76, Cl. D6-114.000.

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CLASSIFICATION OF PATENTS

ISSUED DECEMBER 14, 1976

NOTE.—First number, class; second number, subclass; third number, patent number

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75 3,997,441
83 3,997,442
150 3,997,443
242 R 3,997,444
319 3,997,445
350 3,997,446
360 A 3,997,447
400 3,997,448

CLASS 211

1.5 3,997,059
126 3,997,060

CLASS 212

63 3,997,061
144 3,997,062

CLASS 214

1 BB 3,997,064
1 BD 3,997,065
1 C 3,997,063
5.5 3,997,066
8.5 K 3,997,067
145 A 3,997,068
147 G 3,997,069
152 3,997,070
761 3,997,071

CLASS 219

10.55 R 3,997,752
69 C 3,997,753
99 3,997,754
120 3,997,755
121 P 3,997,756
124 3,997,757
201 3,997,758
272 3,997,759
336 3,997,760
463 3,997,761

CLASS 220

1 C 3,997,073
1 T 3,997,072
71 3,997,074
268 3,997,075
3,997,076

288 3,997,077
315 3,997,078

CLASS 222

5 3,997,079
61 3,997,080
76 3,997,081
108 3,997,082
146 HA 3,997,083
326 3,997,084
3,997,085
385 3,997,086
413 3,997,087
461 3,997,088
545 3,997,089
590 3,997,090

CLASS 223

87 3,997,091

CLASS 224

5 A 3,997,092

CLASS 226

11 3,997,093
19 3,997,094
195 3,997,095

CLASS 227

10 3,997,096

CLASS 228

7 3,997,097
17.7 3,997,098
117 3,997,099
179 3,997,100

CLASS 229

2.5 R 3,997,101
15 3,997,102
17 G Re.29,074

CLASS 233

3 3,997,103
26 3,997,104
3,997,105
27 3,997,106

CLASS 235

61.5 R 3,997,762
61.9 R 3,997,763
92 B 3,997,766
92 FQ 3,997,764
92 SH 3,997,765
151 3,997,767
151.1 3,997,768
151.13 3,997,769
152 3,997,770
3,997,772
156 3,997,771
3,997,773
193 3,997,774
194 Re.29,079

CLASS 236

1 A 3,997,107

CLASS 237

3,997,108
8 R 3,997,109

CLASS 238

14 3,997,110

CLASS 239

1 3,997,111
13 3,997,112
15 3,997,113
16 Re.29,075
127 3,997,114
351 3,997,115
460 3,997,116
533.8 3,997,117
651 3,997,118
652 3,997,119

CLASS 240

1.3 3,997,775
2 SL 3,997,776
2.1 3,997,777
41.35 E 3,997,778

CLASS 241

56 3,997,120
78 3,997,121

CLASS 242

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56 R 3,997,123
68 3,997,124
68.5 3,997,125
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201 3,997,129
211 3,997,130

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CLASS 250

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223 R 3,997,780
3,997,781
231 SE 3,997,782
303 3,997,783
319 3,997,790
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343 3,997,786
359 3,997,787
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390 3,997,789
416 R 3,997,791
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491 3,997,793
505 3,997,794
578 3,997,795

CLASS 251

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205 3,997,141
307 3,997,142

CLASS 252

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8.55 D 3,997,451
8.55 R 3,997,452
8.7 3,997,450
8.75 3,997,453
18 3,997,454
36 3,997,455
62.1 L 3,997,456
63.5 3,997,457
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99 3,997,459
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430 3,997,472
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450 3,997,474
459 3,997,475
463 3,997,476
465 3,997,477
470 3,997,478
520 3,997,479
522 3,997,480
547 3,997,481

CLASS 254

86 R 3,997,143

CLASS 256

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CLASS 259

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8 3,997,146
191 3,997,147

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15 3,997,483
17.4 GC 3,997,484
22 S 3,997,485
23 CP 3,997,486
27 BB 3,997,487
28.5 A 3,997,488
28.5 R 3,997,489
29.2 TN 3,997,490
3,997,491
29.6 WQ 3,997,492
29.7 GP 3,997,493
33.6 UA 3,997,499
33.8 UA 3,997,498
3,997,500
37 R 3,997,502
37 SB 3,997,501
42.15 3,997,503
42.27 3,997,504
42.42 3,997,494
45.75 W 3,997,495
45.8 R 3,997,505
46.5 G 3,997,497
46.5 R 3,997,496
63 X 3,997,507
72 R 3,997,508

75 N 3,997,510
3,997,511
75 R 3,997,512
75 T 3,997,509
77.5 AM 3,997,514
77.5 TB 3,997,513
79.3 M 3,997,515
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112.5 S 3,997,517
140 R 3,997,518
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186 3,997,522
203 3,997,523
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243 R 3,997,531
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251 R 3,997,536
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256.4 C 3,997,537
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268 C 3,997,540
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287 C 3,997,541
287 T 3,997,542
293.53 3,997,543
293.64 3,997,544
294.8 C 3,997,545
295 S 3,997,546
296 B 3,997,547
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306.6 A 3,997,549
306.8 R 3,997,550
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309 3,997,552
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310 D 3,997,556
310 R 3,997,555
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326.13 A 3,997,558
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327 P 3,997,560
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340.5 3,997,564
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340.9 3,997,567
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343.3 3,997,569
343.6 3,997,570
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113 3,997,633
122 3,997,634
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29.7 3,997,638
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120 3,997,643
122 3,997,644
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176 R 3,997,646
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CLASS 267

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152 3,997,151

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CLASS 294

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CLASS 297

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CLASS 298

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269 3,997,800
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310 3,997,802

CLASS 310

8.2 3,997,804
59 3,997,803
90 3,997,805
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319 3,997,222

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138 3,997,823
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603 3,997,828
685 3,997,829

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CLASS 321

15 3,997,832

CLASS 322

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71 SN 3,997,837
109 3,997,839
156 3,997,840

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67 3,997,842
105 3,997,843
304 3,997,844

CLASS 328

143 3,997,845
229 3,997,846

CLASS 329

105 3,997,847
122 3,997,848

CLASS 330

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25 3,997,850
31 3,997,851
35 3,997,852

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94.5 L 3,997,854

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33 3,997,868
62 3,997,869
63 3,997,870
147 LP 3,997,872
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347 AD 3,997,894
347 DA 3,997,892
347 SY 3,997,893

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18 A 3,997,899
100 CS 3,997,901
100 SA 3,997,900
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CLASS 346

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CLASS 350

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96 R 3,997,240
96 WG 3,997,241
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161 S 3,997,243
184 3,997,244
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166 3,997,249
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12 3,997,255
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CLASS 356

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161 3,997,268
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17 3,997,907
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CLASS 358

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CLASS 403

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CLASS 404

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CLASS 417

34 3,997,282
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CLASS 423

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62 3,997,659
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246 3,997,665
250 3,997,666
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274 3,997,669
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23 3,997,284
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405 R 3,997,286

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59 3,997,672
62 3,997,673
90 3,997,674
92 3,997,675
113 3,997,676
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250 3,997,679
262 3,997,680
465 3,997,681
534 3,997,682
550 3,997,684
552 3,997,683
594 3,997,685

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25 3,997,688
82 3,997,689
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195 3,997,691
215 3,997,692
384 3,997,693

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36 3,997,695
164 3,997,696
259 3,997,697
262 3,997,698
276 3,997,699
332 3,997,700
341 3,997,701
352 3,997,702
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144 3,997,366
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CLASS 432

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41 3,997,706
62 3,997,707
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7 3,997,525
17 3,997,524

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	208	242,664		130	242,677		168	242,692		78	242,745			242,716	D34—	5 GC	242,730
	231	242,665		154	242,678	D10—	62	242,693	D19—	34	242,703			242,717		5 K	242,731
	234	242,666			242,679		126	242,694		75	242,704			242,718			242,732
	278	242,667		161	242,680		132	242,695	D23—	3	242,705			242,719			242,733
D4—	17	242,668		177	242,681	D11—	143	242,736		7	242,706	D26—	1 B	242,720		15 AJ	242,734
D6—	56	242,669		189	242,682	D12—	85	242,696		17	242,707		5 C	242,721			242,735
	85	242,670		200	242,683		86	242,697		19	242,708			242,722	D48—	7 R	242,738
	86	242,671	D7—	5	242,684			242,698			242,709		14 A	242,723	D52—	4 R	242,739
	94	242,672		71	242,685		91	242,699			242,710		14 H	242,724	D56—	4 B	242,740
	113	242,673		184	242,687			242,700	D25—	21	242,711	D27—	16	242,725	D64—	12 B	242,741
		242,674	D8—	30	242,688			242,701			242,712		42	242,726	D83—	1 J	242,743
	114	242,675		70	242,689			242,702			242,713	D30—	38	242,727		1 P	242,742
				229	242,690	D15—	29	242,737			242,714		99	242,728		12 R	242,744

CLASSIFICATION OF PLANTS

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GEOGRAPHICAL INDEX OF RESIDENCE OF INVENTORS

(U.S. States, Territories and Armed Forces, the Commonwealth of Puerto Rico, and the Canal Zone)

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(First number in listing denotes location according to above key. Refer to patent number in body of the Official Gazette to obtain details as to inventor name, location, etc.)

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4 : 3,996,659
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		242,688			242,736			242,682			242,716			242,727			242,721
		242,696			242,739			242,687			242,717			242,734			242,729
		242,704			242,741			242,692			242,718			242,738			242,742
		242,706			242,743	20	:	242,744			242,719	39	:	242,673	45	:	242,745
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		242,710			242,720			242,711	36	:	242,668			242,686			

PLANT PATENTS

6	:	3,987		3,989		3,991	17	:	3,988	18	:	3,990	

U. S. GOVERNMENT PRINTING OFFICE : O - 1976

U.S. DEPARTMENT OF COMMERCE
Elliot L. Richardson, Secretary

PATENT AND TRADEMARK OFFICE
C. Marshall Dann, *Commissioner*